STUDIES IN THE PSYCHOLOGY OF STRATEGIC THINKING.

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THE THIRD WORLD . . .

. . .does not mean to organise a great crusade of hunger against the whole of Europe. What it expects from those who for centuries have kept it in slavery is that they will help it to rehabilitate mankind, and make man victorious everywhere, once and for all ... This huge task which consists of re-introducing mankind into the world, the whole of mankind, will be carried out with the indispensible help of the European peoples, who themselves must realise that in the past they have often joined the ranks of our common masters where colonial questions are concerned. To achieve this the European peoples must first decide to wake up and shake themselves, use their brains, and stop playing the stupid game of the Sleeping Beauty.

FRANZ FANON.

PREFACE.

Strategic thinking is an area which has usually been left to the politicians, historians and the military. The development of the theory of games, and the rapid growth of experiments resulting from it in the last decade, has opened the possibility of the serious study of the fundamental psychological processes common to all applications of strategic thinking. The theory of games provides a coherent logical framework for the analysis of strategic situations. But the experimental studies have shown that in such situations, human beings do not act according to the 'rational' prescriptions of the theory of games.

This dissertation is an attempt to demonstrate experimentally some of the psychological variables influencing strategic thinking. In a field study in Cyprus the same basic psychological measureing instruments were applied to examine the possibility of using concepts and measurements derived in the laboratory in the analysis of the strategic considerations of an on-going conflict.

The studies were carried out in Oslo, Norway, and Cyprus, in 1965, within the stimulating milieu of the International Peace Research Institute, Oslo. To those who have experienced this stimulation (their number grows rapidly large), my debt in the following pages will be obvious. The 'milieu' extends by now to friends in Copenhagen, Lund and London who, like myself, have been exposed to the whirlwind of creative ideas, theories and research of the Oslo institute's Director, Professor Johan Galtung. Sometimes we have been caught up in his ideas, sometimes we have spun off in another direction. Always we have gained from the immersion, and I would here like to express my gratitude.

The findings reported here have been published previously in a series of papers in the Journal of Peace Research and the Proc-

eedings of the International Peace Research Association, as acknowledged in appropriate footnotes in the text. However, they have been subjected to thorough revision and in some cases reanalysis, as in the case of the factor analyses presented in Chapter 4 for the first time.

The findings are supplemented by a more complete attempt to spell out the theoretical considerations guiding the study and a review of much of the relevant literature. The final chapter expands some of the implications of the rest of the dissertation into an initial attempt at a possible theory of strategic thinking. This was presented at an early stage at a seminar at the International Peace Research Institute, Oslo, but has not otherwise been presented in public. It is intended that this will form the basis of some further studies. These will be carried out at the Institutes of Psychology and Sociology, University of Bergen, with funds from the Norwegian Council for Research in Science and the Humanities.

The present research would not have been possible without the financial support of the Department of Education and Science, London. I am also grateful for material support from the International Peace Research Institute, Oslo, and the Institute of Psychology, University of Oslo. The dissertation has been written while at Professor Stein Rokkan's Institute of Sociology, University of Bergen. My thanks for this opportunity are due to Professor Fredrik Barth, who as an anthropologist renowned for his use of game theory, gave me important feedback on my own field research, and then suggested I come to Bergen.

For advice and assistance in the experiment I would like to thank Finn Tschudi and Hilmar Nordvik, of the Institute of Psychology, University of Oslo. The field study could not have been carried out without the help of the United Nations Association International Service and War on Want (London). Any value there is in my attempt at analysing the Cyprus situation is due to the friendly hospitality of the Cypriot people, who readily provided me with information, and in particular to Daphnis Panagides, whose many years of struggle on behalf of his people did not prevent him taking time to introduce me to them and their problems.

Finally, I should like to thank my supervisors in Edinburgh. This difficult job was first taken on by Professor James Drever and Dr. John Butcher, and later by Drs. John and Halla Beloff. An absent pupil is the not the easiest to teach, especially when he does not write as often as he should. I hope that any confusion I may have given them as to what I was doing will be cleared up with the presentation of this thesis. No responsibility for any inadequacies can be placed upon them, and I regret that I have not made better use of their talents and experience.

M.L.

Bergen/May, 1968.

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1. INTRODUCTION

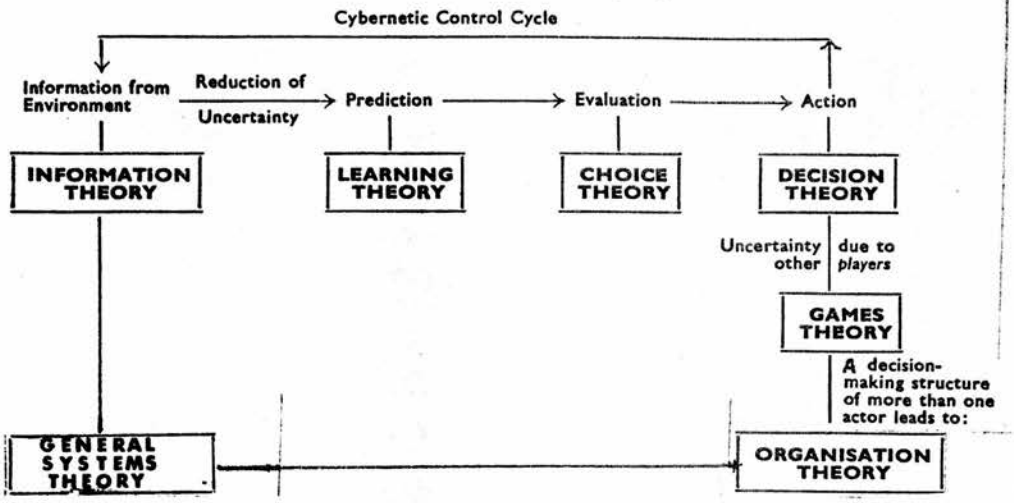
1.1. Decision-making.

Let us imagine an actor, A, a living system maintaining a dynamic steady state in a complex environment. Of the possible actions, many are subject to physical, biological and other restrictions. We may say, however, that A has a set of actions $(a_1, a_2, \ldots a_i)$ available to him. In decision theory (e.g. Edwards, 1954; Thrall, Coombs and Davis, 1954), each of these actions would, at a given time t, result in a certain outcome with utility, U, and probability, p. Thus, at time t, A may choose from the set of actions according to the decision matrix $((U_{a_1} \cdot p_{a_1}), (U_{a_2} \cdot p_{a_2}), \ldots (U_{a_i} \cdot p_{a_i}))$. The outcome of the choice of action results in a feedback of information enabling A to check the accuracy of the prediction determining the previous choice and hence providing the basis for a succeeding choice of action. In this way A is able to adapt to the realities of the external environment.

These concepts form the basis of contemporary cybernetics (Wiener, 1949, 1950), information theory (Shannon & Weaver, 1949; Cherry, 1957), choice or utility theory (e.g. Marschak, 1954) and decision theory (Edwards, op. cit.; Thrall, Coombs & Davis, op. cit.) These theories have in general developed as branches of formal applied mathematics, stimulated by new disciplines such as communications engineering and operations research. While they have been developed outside the confines of academic psychology, they seem to the present author to offer the possibility of a comprehensive framework for analysis of a range of psychological problems. A more systematic attempt to examine the implications of these theories for psychological theory is made in The Logic of Human Relations: Aspects of the Theory of Games as a Model of Human Behaviour (Lumsden, 1964). Only some of the major aspects will be pointed out here since the present aim is empirical application rather than theoretical development.

The model of A's behaviour suggested above already leaps into the realm of psychology from that of pure decision theory since, as Stogdill (1962) points out, "Decision theory and utility theory are based on simplifying assumptions that seriously limit the validity of any outcomes generated by the theories. Only when expectation is defined as a learning or reinforcement theory does it appear capable of predicting response and accounting for

Diagram 1. *Inter-relationship of some contemporary theories*



the complexities of individual personality and group structure." (p.52.) Statistical learning theory (e.g. Estes, 1954, 1959, 1960; Bush & Mosteller, 1955) fits comfortably into the same class of theories. That they deal with parts of a complex process is suggested by the way they are inter-related in Diagram 1.

The theory of games is added to the schema because it may be regarded as dealing with a subclass of decision processes, those where the major source of uncertainty in A's environment is due to other actors. Organisation theory deals with that class of actor which is itself a set of actors, organised according to certain formal and informal rules (roles). General systems theory deals with the interaction of such systems of actors. In concerning itself with systems of interacting systems, general systems theory to some extent subsumes all of the the other theories; on the other hand it points to changes in the state of the system resulting from the total nature of that system rather than from aspects of the subprocesses functioning within the system.

Information theory has had a great influence on psychology which may perhaps be summarised as follows. Information has a complex function:

1. Information is required to give the probablility functions, p; since the actual probablilities are rarely known, these will usually be estimates made by A on the basis of information available at time t. (I.e. they are subjective probabilities.) At time t + 1, the estimate may be revised on the basis of additional information generated by the outcome of the action at time t. This kind of information is known in information theory as H, where the average amount of information conveyed by one event in a series of events is defined as

$$H_n = -\sum_{i=1}^{n} p_i \log_2 p_i,$$

where p_i is the probability (relative frequency) of the event, and the unit is bits (binary digits) of information (Shannon & Weaver, 1949; Cherry, 1957).

2. Information is required about the utility of the available outcomes of actions. That is, the information transmitted from the environment may also carry significance, or meaning, which we shall denote S. (See Leont'ev & Krinchik, 1962; Osgood, Suci & Tannenbaum, 1957.) This enables A to put a value on the alternatives available as well as a probability.

3. In a situation of uncertainty, information itself may have a value. It may thus also have a cost. (That is, A may expend energy on certain actions purely to obtain information.)

Information not only needs to be acquired, it needs to be processed, another factor to be considered when assessing the cost of the information. As Lanzetta and Kanareff put it in a paper entitled 'Information cost, amount of payoff and level of aspiration as determinants of information-seeking in decision-making': "As the cost of available information increases or as the difficulty of 'understanding' the information increases, the value of acquiring further information would presumeably decrease while the value of processing time would increase." (1966, p.472.) While generalised anxiety seems to increase processing time, Leont'ev and Krincik's work seems to suggest anxiety about a specific stimulus (e.g. a light signalling an approaching electric shock unless avoidance action is taken) may decrease processing time for information and decision-making about that stimulus.

Information is stored (memory) and organised by A, enabling him to structure the environment, to form a cognitive framework as a basis for action (Garner, 1962). The payoff matrix may be regarded as a simple model of (part of) such a cognitive framework

The concept of the matrix (which can have any number of dimensions, as well as any number of possibilities along each dimension) is used extensively in the cognitive theories of writers as different as Jean Piaget (see Flavell, 1963) and Arthur Koestler (1964). These theories are not concerned with what goes on in each cell of the matrix but rather with the logical (or psychological) operations which can be performed on a matrix (for instance, combining two existing matrices to form a new one, the basis of Koestler's 'act of creation'). The matrix is fundamental both to computer programming and to modern concepts of methodology in the social sciences (see Cattell, 1966; Galtung, 1967). Such theories point to the richness and complexity of the matrix as a conceptual model. The 2 x 2 matrix which we shall use extensively later is the result of simplification in the interests of experimental application not of theoretical paucity.

In brief, we are suggesting a model where A's set of actions form one dimension, and the set of states of the environment form another dimension. This may be modified to 'perceived' set of actions, and 'perceived' states of the world. On the basis of the information A receives from the environment he assigns probabilities and utilities to each cell of the resulting matrix, i.e. the outcome resulting from the intersection of each possible action with each possible state of the world. He then chooses in such a way as to maximise the exptected utility (Arrow,1963). This our point of departure; the distinct limitations we shall return to later.

1.2. Strategic thinking.

Where the set of environmental states is contingent upon the actions of another actor (an individual or group), then the matrix as a cognitive model becomes a strategic model. Another actor, B, is a quite special source of uncertainty, since B is capable of acting independently: the uncertainty he produces may not readily be reducible by simple observation, since his behaviour is unlikely to be either random or recursive. In some circumstances B's behaviour may be entirely conditional on A's, but on other occasions B may be deliberately trying to make his actions unpredictable to A.

In order to act B too needs to reduce the uncertainty in the environment - and one way to do this may be to make A's actions predictable. This will doubtless compromise A's feeling of freedom; the very presence of B in the environment may limit A's possible actions. The same applies to B. Thus we are faced with the primary existential dilemma of human relations: if A admits B as a subject rather than as an object - as an individual, independent, acting being, rather than as part of the passive environment - then A is threatened with a limitation of his freedom as an actor (Sartre, 1956; May, 1958). Much of the complexity and interest of the human condition revolves around attempts to solve this dilemma (Barnes, 1959).

Let us analyse the situation a little further in terms of the matrix. The first step in strategic thinking is to assess the range of actions from which B is likely to choose in the given situation at the given time. This will in turn open a set of possible actions to A. A's set of actions and B's set of actions thus form the dimensions of a matrix.

A's admittance of B as an actor in a given situation usually also defines the possible outcomes of the interaction, which will (presumeably) include the goals of A and B. These may be directly opposed, as where there is a single indivisible goal-object which both desire to obtain - the situation referred to by game theorists as zero-sum (Von Neumann & Morgernstern, 1944). In a non-zero-sum game, the sum of A's gains and B's losses (and vice versa) will not always equal zero (i.e. both may gain or both may lose).

The second step in strategic thinking, once B has been admitted to the 'game', is for A to try to assess which action will be taken by B, so that A can determine his own action accordingly. This is more difficult

than simple probability learning, since B may at any time change any strategy that he may have adopted. B will change his strategy according to what he thinks A will do. Thus A has to try to assess what B thinks A will do, and hence what B himself will do, before A can decide what to do himself. This is a recursive procedure and could go on to infinity, neither able to decide what to do. While a computer can be programmed to carry out such recursive procedures, up to the limits of its memory store, there is some evidence that the human brain is limited to two or three recursive cycles (Miller, 1964).

However, B will probably show some regularities in his behaviour which simplify A's task of predicting his behaviour. These regularities may be expected to be related to the values of the outcomes available. Thus A should preferably know not only the values of the outcomes to himself, but also the values of the outcomes to B. This may seem simple but can be difficult, since B may have a different value system. A may thus also have to assess the utilities that B is placing on the outcomes by observing which outcomes B seeks to avoid, and which he seeks to attain. That is, B's actions (in response at least partially to A's actions) carry not only information, H, about the liklihood of his choosing one action rather than another, but also information, S, about the significance of the outcomes he experiences. In the theory of games (Von Neumann & Morgernstern, op.cit.; Luce & Raiffa, 1957; Midgaard, 1965) a clear distinction is made between games of perfect information, where the players know both the values of the outcomes to all the players and which choices are actually made, and games with less than perfect information. Further, game theory makes strong assumptions about the rationality of the players, and, though it is unstated in the axioms, about their powers of logical computation. Thus, though we shall from time to time make use of concepts drawn from formal game theory, we shall in general base our analysis of A's strategic thinking on our psychological model.

In A's strategic thinking there are at least three levels of sophistication in assessing the information transmitted by the sequence of events and in determining the subsequent action:

(1). Only the significance of the outcome to A is utilised by A, and he fails entirely to take B into account.

(2). A takes note of the choices made by B with a view to establishing any regularities in B's behaviour and acting accordingly. A uses information H available from the relative frequencies of B's actions, but does not take into account the significance of the outcomes to B.

(3). A utilises all the information available: if he observes that B is losing by his choice of action, he begins to infer that B may change his strategy (which is often what A wants B to do), or to infer that the particular action is chosen because other options are not available (perhaps for moral or political reasons outside the game), or because B very much desires the resulting outcome if A changed his course of action.

The third stage is thus very much more complex than the first stage where A only takes into account his personal gains and losses. For instance, if he wins he might be expected to make the same choice again; if he loses he might be expected to make another choice on the next occasion. Thus 'stay' the same' and 'change' form the only two strategies available, and the result of the previous trial provides all the information needed to choose between them. This is very simmlar to what Peter Cooper (1965,1966) calls 'effects logic', while the other stages seem to exemplify what he calls 'processes logic' and 'causes logic'.

There is a further stage in this analysis, however, While A may himself be operating at one of the higher levels above, he may only credit B with the ability to employ one of the lower levels. Thus A may think he can change B's chosen course of action by 'punishing' him, assuming that B's thinking is at level 1. This assumption may be unfounded, perhaps to A's subsequent loss when B's behaviour ceases to resemble A's expectations. In experimental games, and in real life, it is therefore not surprising to find long periods of 'learning' before the interaction becomes at all stable.

1.3. The application of the theory of games to the study of strategic thinking: the experimental record.

The theory of games, originated by von Neumann and Morgernstern (1944), is a sophisticated attempt to construct a complete axiomatic system 'prescribing' the optimum choice in any theoretical strategic game. The theory of games is not concerned with games of chance or games of physical skill. Since the optimum choice is to befound for all the players, knowledge of these choices may be said to be the 'solution' of the game.

Like all axiomatic systems, certain assumptions are introduced. The major assumptions of the theory of games are (i) that the players are able to order the possible outcomes according to preference. These preferences are assumed to be consistent and invariant during the game. (ii) The players are assumed to have perfect rationality, acting only on the basis of maximising

expected utility, with no limitations on their powers of logical deduction, and not subject to such considerations as those in the previous section. Nevertheless, precisely because it puts into such sharp relief the points of divergence of logical and psychological elements in strategic thinking, it is a worthwhile exercise the see to what extent game theoretic analyses can be applied. Given the clear logical structure provided by the theory of games extensive research efforts have been made in the last few years the clarify the psychological components of strategic thinking as exemplified in experimental games.

A game may have one move or many (e.g. chess). The sequence of moves may be depicted as a game tree. The combination of choices at each move from start to finish is known as a strategy. Thus in a one-move game, with, say, two alternatives (e.g. 'heads' or 'tails') there are only two strategies. If there were two moves and two alternatives each time, there would be four strategies (e.g. heads-heads, heads-tails, tails-heads, or tails-tails). The end result of each such strategy is a payoff to each player. The strategies available to each player form the dimensions of a matrix, with the payoffs entered in each cell. Thus the sequence of moves shown in the game tree, the so-called extensive form of the game, may be reduced to a single matrix, the normalised form of the game. In other words, for the sake of simplicty, a sequence of moves can be depicted by a single strategy choice in a payoff matrix.

A distinction is made between zero-sum and non-zero-sum (or non-constant sum) games. Zero-sum games are those where what one player wins the other must lose (i.e. the sum of A's gains and B's losses is zero). Zero-sum games may have a saddle-point - an entry in the payoff matrix which is at the same time the minimum payoff in the row and the maximum in the column. Von Neumann and Morgernstern proposed that this was the solution to the game, because the saddle-point is the outcome which minimises the maximum loss to each player regardless of what the other player chooses. A pure 'saddle-point strategy' is thus the most rational since it is not possible to lose more if the other player is also 'rational' and if he is not it is possible to win more. In zero-sum games without a saddle-point von Neumann and Morgernstern proposed a mixed strategy which minimised the maximum loss in terms of a long-run expected payoff over repeated trials of the game. The ratio of the 'mix' can be strictly calculated from the payoff matrix.

The significance of the distinction between zero-sum and non-zero-sum now becomes clear. Von Neumann and Morgernstern' s work showed that

theoretically in any situation where what one actor wins the other must lose then the optimum pure strategy could be presribed where there is a saddle-point or the optimum mixed strategy where is no saddle-point. This applies just as much to many military or economic situations as to a game of chess. The reason why chess has not been reduced to triviality is because there are too many strategies for anyone to be able to calculate the optimum one. In situations where there are limited options and the payoffs can be evaluated some success is claimed for practical applications. Lieberman (1960) has shown that subjects, untrained in game theory, can learn to approximate saddle-point strategy after a number of trials.

The theory of non-zero-sum games is much more complex, since the payoffs to one player are not necessarily the converse of those to the other: it is as possible for both to win as it is for both to lose. (Hence the reason for the expression 'non-constant-sum', since all the payoffs, to both players may, for example be positive.) First a distinction between co-operative and non-co-operative games: in co-operative games communication is possible, leading to, for example, bargaining games. Non-co-operative games are non-negotiable. In experimental situations this means that the only form of communication between the players is the information about the outcome of the previous trials - a fact we shall make use of in later chapters. In n-person games, von Neumann and Morgernstern believed that coalitions would form, reducing the game to a two-person game. Likewise, they believed that where bargaining was allowed a 'coalition' would be formed by the players against 'nature' so that the game was no longer one of pure strategy against a rational player. This is the theory behind the experimental games we shall discuss later where communication is not allowed: it is such an important variable that it quite alters the strategic nature of the situation.

In analysing non-zero-sum games, von Neumann and Morgernstern proposed the concept of a dominating strategy. A dominating strategy is one which assures a better payoff, whatever the other player does. Where both players have a dominating strategy, then the resulting outcome may be said to be strongly stable, if not a solution to the game. This concept is elaborated in section 3.3.4. when it is applied to the Cyprus conflict. Doubt about whether a dominating strategy pair is a solution to the game is provided by the following example - the Prisoner's Dilemma.

Two suspects are arrested and placed in separate cells of a prison. (The game is 'non-negotiable'.) They are suspected of a serious crime, but the authorities have only sufficent evidence to convict them of a minor crime

Each is informed that if he confesses to the circumstances of the crime (turns Queen's or State's evidence) he will be released after a minor sentence while the other suspect will receive the maximum punishment. If neither confess, they will both be convicted of the lesser crime; if both confess, both will be convicted of the major crime, somewhat moderated because of the confession. The dilemma is thus whether to confess or not, and the payoffs might be as shown below:

		Suspect B: not confess	Suspect B: confess
Suspect A:	not confess	1 year each.	10 years for A/ 6 months for B.
	confess	6 months for A/ 10 years for B.	8 years each.

(from Brand, 1966).

In such a case it is clear that 6 months is better than 1 year, and 8 years is better than 10 years. That is, whatever choice B makes, A will be better off choosing to confess. So will B. Thus both are dominated by the 'confess' strategy. According to all the assumptions of rationality in the theory of games both should therefore make the choice which results in 8 years imprisonment for both of them. If neither confessed, the 'irrational' choice according to game theory, they would each recieve only one year in jail. The Prisoner's Dilemmais also a game theorist's dilemma. (A number of attempts to solve the dilemma for the games theorist have been made, e.g. by Amnon Rapoport (1967).) Since communication is not allowed, any attempt by one or both of the players in such a game to try to achieve the more moderate sentence for each of them involves such psychological factors as co-operativeness and trust, and it is this which brought the game to the attention of psychologists, particularly after Luce and Raiffa's discussion of Games and Decisions (1957).

Reviews of the literature on experimental games, which is by now considerable, have been made by Rapoport and Orwant (1962) and Gallo and McClintock (1965). Since that time at least some forty or fifty papers have been published on the subject. These may be divided into two broad categories: experiments varying the nature of the game, and experiments varying the nature of the players.

Experiments varying the game. In a Prisoner's Dilemma where we have two players, A and B, each have two choices which we may call C (not confess, or 'co-operate') and D (confess, or 'defect'). Where both choose C (the CC outcome) the payoff may be called R, the reward for c-operation. Where both defect, the payoff may be called P, the punishment for defection. The

DC outcome may be called T, the temptation to defect; and the CD outcome may be called S, the 'sucker's' payoff (following terminology suggested by Rapoport (1963)). A PD game is then one where $T > R > P > S$. A Chicken game (the other most 'famous' game) is one where $T > R > S > P$. In this case the punishment to both for defecting is the worst possible payoff. Thus, since some people suggest that the logic of these games is the same as that of the Cold War, the type of game it is depends on the evaluation of nuclear war, relative to 'losing out' to Communism or Capitalism. If it is better to be 'Red than dead', then the 'game' is one of Chicken. If it is better to be 'dead than Red', then it is a Prisoner's Dilemma. (Later we shall compare behaviour in both these games, and propose a means of measuring such crucial differences in evaluation - something which does not seem to have been done elsewhere.)

Most of the work has been done on PD games, using the two-person, two-choice paradigm. No attempt seems to have been made to study the effect of an increase in the number of alternatives available (see discussion of information transmission in Chapter 2). The major remaining structural variables are therefore the number of trials, the relative value of the rewards (i.e. variations in the parameters T,R,P, and S), and the absolute values of the rewards.

The number of trials is important because it may allow opportunities for learning. While 'rational' considerations seemed to lead to the DD outcome, Luce and Raiffa (1957) believed that in practice subjects would learn to become increasingly co-operative. On the other hand, the 'rational' tendency to defect could be expected on the known last trial; however, if the players reasoned like this, the result of the last trial then became a foregone conclusion so that the previous trial became the effective last trial; however, . . . The possibility of the 'end' effect operating is usually eliminated by not allowing the subjects to know which is the last trial. Both Morehous (1966) and Rapoport and Dale (1966) have evidence that there is less co-operation on the known last trial. The effect, in practice, does not seem to go further back than that.

Most experiments find that the chance of choosing C on the first trial is somewhat less than 50%. Thereafter the amount of co-operation seems to decline, contrary to Luce and Raiffa's expectation. In Rapoport's (e.g. 1963) experiments subjects typically continued for 300 trials or more. In this case it was found that there was later in the game a tendency to increase in co-operation, especially amongst the men. McClintock (1963) found that 'inter-

nationalists', after an initial decline in proportion of C choices, became more co-operative later, contrary to 'isolationists'. Thus, differences in the players, which we shall discuss later, do not seem to show up until after some 20-50 trials. Rapoport's work suggests that it is not so much general factors of 'co-operativeness' or 'competitiveness' which are at issue, but rather propensities to respond with co-operation or defection following co-operation or defection of the partner. These propensities, which can be exactly calculated (e.g. by counting the number of times in 100 trials A chooses C following CC, CD, DC & DD outcomes), may be given psychologically meaningful labels, such as 'trustworthiness' (C/CC), 'forgiveness' (C/CD), 'repentence' or 'responsiveness' (to co-operation) (C/DC) and 'trust' (C/DD). It is these propensities which may vary according to the type of game and the nature of the players. For the effect of these propensities to become obvious a fairly high number of trials is required. Put in another way, "the amount of achieved co-operation is a direct function of the number of trials" (Lave, 1965).

Given that the payoffs can represent such things as 'reward for co-operation' and 'temptation to defect', an obvious result is that one can vary these parameters to see if co-operation and defection vary accordingly. Rapoport's evidence on the basis of an extensive series of experiments (Rapoport, 1963; Rapoport & Chammah, 1965) is that in general they do. However, as Rapoport (1966) points out, there may be an interesting difference here between Prisoner's Dilemma and Chicken games. In PD, increase in the punishment for joint defection may be expected to increase co-operation (as it does). In a Chicken game, the DD outcome is already the worst, so that increasing it may not necessarily make the players more co-operative, though it may. On the other hand, an increase in the punishment may tempt a player into thinking that the partner will not dare to choose D, so he can do so with impunity, so that an increase in the P parameter may decrease the co-operation. This is a major reason why strategists have ceased to talk of 'massive retaliation' (leading, in the nuclear context, to probably total obliteration for both sides) and now talk of 'limited war'.

The sensitivity of the level of co-operation to the parameters R,S,R & T, has led to a number of attempts to find an index, relating these parameters directly to the amount of co-operation (Rapoport, 1967a; Axelrod, 1967; Steele & Tedeschi, 1967). The most recent of these, log (T-S)/(R-P), is claimed by its authors, Steele and Tedeschi, to correlate (Pearson r) .641 with proportion of defecting choices in a wide range of experiments.

Absolute differences in the payoffs may also be varied. If the logic of the PD is a general phenomenon, then its effects should apply whatever the order of value of the payoffs. Evans (1964) found no significant differences in behaviour where payoffs were in terms of imaginary money and real points on a subject's examination score. This was the opposite to Gallo's (1963) finding of differences in the Deutsch and Krauss trucking game when money payoffs were real instead of imaginary. McClintock and McNeel (1966), in what they refer to as the Maximising Difference (MD) game, found in general similar results using Belgian students to most of the other experiments using American students but found that where payoffs were higher (.5fr. per point) co-operation was higher than where they were lower (.05 fr. per point). However, this does not allow us to say anything about the PD game or other samples. Radlow (Radlow, 1965; Radlow & Weidner, 1966) uses a technique of having a payoff matrix in whole dollars, but of only paying out on one trial, determined by a random procedure; the results seem to be essentially similar.

Bixenstine and Blundell (1966) used manipulations of the payoff structure to show that the payoff accruing to the lone defector was more strongly motivating than the fear of getting the small payoff of the lone co-operator in leading to a D choice.

PD games inherently allow of no communication between the players, but Radlow and Weidner (1966) compared the usual situation with one where the players were able to choose from a set of commitment cards, which were shown to the other player. The commitments were not enforcible in any way, but nevertheless they resulted in a high and constant degree of co-operation. The standard group's level of co-operation was low and showed the 'U-shaped' effect previously reported independently by Radlow (1965) and Rapoport and Chammah (1965). Radlow suggests that the U-shaped curve results from the fact that the lack of communication means that the choices are the only way available for the players to "explore one another's intent". We shall take up this point later.

Experiments varying the subjects. As Bixenstine and Blundell (1966) point out, so much of the variation in experimental games is accounted for by structural, stochastic and dynamic (strategic) factors, that there is little left to be related to personality. In addition, as Rapoport (1963) has shown, there is so much of an interaction between the players that individual influences are very difficult to determine. Nevertheless, when the games are run for a sufficient number of trials and matched groups of subjects are compared, differences emerge on a number of personality dimensions.

Lutzker (1960) found that 'internationalists' were more co-operative than 'isolationists', comparing the top and bottom quartiles of a sample who had completed a scale of attitudes. This finding was confirmed by McClintock et. al. (1963), who showed that after a number of trials the internationalists showed the U-shaped effect, whereas the isolationists did not. Using the experimenter as a stooge partner playing strategies of 85%, 50% and 15% C, they found that the strategy of the 'other player' seemed to have no significant effect on these results. (The strategy of the other player has also been varied by Bixenstine & Wilson (1963), Sermat (1964), Solomon (1960) and Harford & Solomon (1967). Most of these authors find that the strategy of the other player does affect behaviour.)

Dolbear and Lave (1966) could find no significant relationship between behaviour in a PD game and a measure of risk orientation. Nor, in a different kind of game, could Pilisuk et al. (1965).

Oskamp and Perlman (1965, 1966) have found that students in a small college seem to be more co-operative than students at a large university. In their second experiment they compared groups on a sociometric measure of friendship and found that in one case the higher the friendship between a pair the higher the co-operation; in the other case the higher the friendship, the lower the co-operation. In the latter case they suggested that the emphasis on business and politics at the particular institution may help to explain the results. Swingle (1966) (in another kind of game) found that an unco-operative partner produced a reduction in S's level of co-operative responding when the partner was either liked or unknown, but the initial level of C was maintained when the partner was disliked. Ratings of the partner on semantic differentials seemed to suggest that negative attitude change might inhibit retaliatory behaviour.

Wrightsman (1966), on a two-trial game with female subjects, found that persons who believe human nature to be altruistic, trustworthy and independent (Philosophies of Human Nature Scale) behaved in the game situation in more trusting ways. However, he found no other personality or attitude measure which correlated. Real vs. imaginary payoffs seemed to have little influence. Marlowe (1963) reported on the basis of an adjective check list that co-operative subjects scored higher on need- abasement and deference, non-co-operative subjects scored higher on need-aggression and autonomy.

Dencik and Wiberg (1966) find, using Swedish students, that socially open people are more co-operative than socially rigid. Their Social Rigidity Index was made up of the F-scale (Adorno, et al., 1950), the Dogmatism scale (Rokeach, 1960) and the L-scale (Himmelstrand, 1960; Rubenowitz, 1963; Dencik, 1965). They found, however, that there was a high correlation between sex of respondent and score on their SRI, with females being more socially rigid. While sex differences did not seem to be indicated in early experiments, they showed up clearly in the work of McClintock et al. (1963), Rapoport & Chammah (1965). Sampson and Kardush (1965) reported that in a sample of white children the older males were more collaborative, the older females were less collaborative. Negro children were more collaborative at all stages, and they did not show any sex differences. Indeed, post-session questioning indicated that the Negroes not only collaborated but acted in a manner to help their partner gain higher rewards for himself. The white children in the higher socioeconomic class became less co-operative during the game in the younger group, and more co-operative in the older group (seven to nine years and ten to eleven respectively).

All this seems to indicate that socialisation towards co-operative and competitive behaviour, as it differentially affects age-groups, sexes, classes, races, friends, unknowns and enemies, is a major factor determining the cognitive processes behind game-playing behaviour.

A two-person, two-choice game has four possible outcomes. Since the preferences for these four outcomes held by the two players may be in any order. That is, there are 4! preference orderings for each player (= 24). 24 x 24 results in 576 different possible 2 x 2 games, though only 78 of these are non-equivalent. Rapoport and Guyer (1966) have recently made a taxonomy of these games, which we make use of in Chapter 3.3. In a subsequent article, Rapoport (1967b) points out that of the twelve symmetric games, eight are no-conflict games (i.e. where both players have a common most preferred outcome). Of the remaining four, one is the Prisoner's Dilemma and another is Chicken (that is, both of these games turn out to be unique). One of the other two games requires that a player changing to a co-operative strategy rewards both himself and the other player, but himself more than the other player; in the other, the change to a co-operative strategy by one player rewards both but the other player more than himself. Rapoport suggests that these four games, bringing out the roles of 'martyr', 'exploiter',

'hero' and 'leader' form four 'archetypes' deserving of further study.

A somewhat different attempt at classifying games was made by Wilson and Bixenstine (1962). They presented games which allowed absolute control over personal gain (AP control), conditional control over personal gain (CP control), absolute control over the other's gain (AO control) and conditional control over the other's gain. (which follows from CP). The pointed out that a knowledge of these forms of social control (AP, CP, AO, for each player) plus the average gain and the average difference in gain could describe the matrix completely.

A number of other kinds of experimental games have been employed, not based to the same degree on game theoretic models. Shure, Meeker and Hansford (1965) have studied the effectiveness of 'pacifist' strategies in a situation involving manipulation of a mechanical device. Swingle (1967) has studied 'win-loss differences' in a set-up using model trains and a tunnel. This has some similarities to the Deutsch and Krauss (1960, 1962) trucking game, which has been particularly used to study the effect of threat upon interpersonal bargaining (Borah, 1963; Shomer, quoted in Kelley, 1965).

Pilisuk and Rapoport have designed a multi-choice version of the Prisoner's Dilemma which has been used in a series of disarmament studies (Pilisuk & Rapoport, 1964; Pilisuk, et al. 1965; Pilisuk, 1966; Pilisuk, et al., 1967).

Pylyshyn, Agnew and Illingworth (1966), following up other studies of group vs. individual problem-solving (e.g. Faust, 1959), compared individuals and pairs as participants in a PD game. They found that the pairs tended to be both more co-operative, especially later in the game, and to be more predictable (i.e. show less uncertainty) in their behaviour.

Bixenstine, Levitt and Wilson (1966) found in a six-person form of the Prisoner's Dilemma that there appeared to no difference in the behaviour compared with a two-person game. On the other hand, a condition allowing communication enabled 'contracts' to be formed which resulted in high subsequent co-operation.

In spite of the complexities, the experimental record seems to show that human subjects do act in logical and consistent fashions in the Prisoner's Dilemma and other such situations, but the logic is not that of game theory. It seems a long way from the games of perfect information played by completely Machiavellian players described by the formal Theory of Games to the strategic behaviour exhibited in situations of considerably less than perfect information (about the level of strategic thinking used by the other player, about his utilities, the external limitations to his freedom of action, etc.,) in which less than Machiavellian human beings usually have to act. Since in many cases each player will be less than completely rational (in the game theory sense), and will be unlikely to credit the other player with a greater degree of rationality, each will be faced with the additional problem of making some assessment of what kind of person the other player is. A strategic choice is much easier to make if the nature and capabilities of the other player are known.

As Morton Deutsch (1961) has pointed out there are social situations which do not allow 'rational' behaviour as long as the conditions for mutual trust do not exist (using 'rational' here in the everyday sense, implying co-operation in the PD game); but mutual trust is most likely to appear where people are positively oriented to each other's welfare. It is precisely this element which is lacking in the context of international conflict. While Deutsch (1960) was able to increase the co-operation of players in an experimental game by emphasising a co-operative orientation in the preplay instructions, players on the international scence are unlikely to be amenable to such treatment. 'Motivational orientation' in international relations is likely to be the result of a long history of prior interaction.

While the restriction to two choices most often used in experimental situations is a gross oversimplification of most real-life situations, it has a certain validity at some levels. For instance, at time t, one can either 'act' or 'not act'. (perhaps in the hope that at time t + 1, more information will be available, or the problem will have 'solved itself'). In extreme situations the limitation of the range of choices has even more justification. It is well known that emotional stress decreases the capacity for processing information (e.g. Leontev & Krinchik, 1962; Osgood, Suci & Tannenbaum, 1957). Smoker (1967) has recently demonstrated the phenomenon in a study of response delays to diplomatic notes between India and China at times of crisis. 'Psychologic' (Osgood, 1961) then

limits the number of perceived alternatives by 'rounding-off' the probablility-utility structure of the possible outcomes. This increases the cognitive structure and reduces uncertainty to make the most efficient use of the limited information-processing capacity. Vail (1954), Edwards (1954), and Van der Meer (1963) have all demonstrated a 'preference'in probability estimates for the 'round numbers' (0.0, 0.5, 1.0, etc.) even in relatively non-stressful experimental situations. Festinger's cognitive dissonance resolution (1957) may be interpreted in terms of rounding off the utilities.

In conditions of stress, behavioural alternatives may be limited to 'flight' and 'defence' (Ursin, 1965). Ursin has isolated two closely related areas in the amygdaloid substrate of the cat which when stimulated 'trigger-off' one or other of these two responses. Similar findings have since been reported in pigeons by Steen (quoted in Dalland, 1967). If such specific relations between brain structure are found in widely diverse species such as a carnivore and a bird then similar relations may be present in higher animals. The relevancehere is that the flight and defence reactions were found to be clear-cut and typical and the only two such reactions found.

The problem then becomes one of getting enough information to one of the flight or defence 'boxes' to trigger off only one kind of behaviour. Man's peculiar aggressiveness (for some ethological discussions see, for example, Carthy & Ebling, 1964) may be encouraged by a number of mechanisms:

1. The complexity of the human brain compared to lower animals (a complexity believed now neuropsychologists to apply equally to the lower centres of the brain - see Dalland, 1967) has complicated and differentiated the 'triggering mechanism' of reflex actions.

2. The social nature of man has added threats to his social existence to threats to his personal existence as triggers to extreme behaviour. (The same may be said of baboons, for example.)

3. Human society, particularly when oriented towards war, has developed devices to prevent flight (e.g. the shooting of deserters), thus leaving only one of the alternatives, 'defence'.

4. Face-saving mechanisms, often to used to avoid confrontations in the animal world, suffer in human society because of the publicness of most such confrontations.

6. The development of military technology (and the concomitant forms of social organisation), enabling an increasing distance between the conflicting parties (whether geographical, social, cultural, economic or political) tends to increase the abstraction of the threats involved and to decrease the possibility of testing perceptions against reality. It may thus lead to an increase in autistic over reality thinking (see McKellar, 1957), where the abstracted enemy, conflict, threats to existence, etc., are able to increasingly serve the personality needs of the individual and the needs of society.

In a word, Man may be becoming a slave of his ideology, not of his instincts.

Though the credibility is rather low, the Prisoner's Dilemma is supposed to model an extreme situation: literally one of life and death. Though flight is precluded, each prisoner may either try to defend himself (by confessing), or sit back in the hope that the other prisoner will do the same. Death is the penalty for losing. In the paradigm no social or ideological factors are supposed to be operating. The Chicken game also restricts behaviour to the basic elements of 'flight' or 'defence': in this case 'defence' means maintaining one's course of action, 'flight' means changing one's course of action (i.e.the opposite situation to that of the Prisoner's Dilemma). In the formal theory, payoffs are usually numbers; in experimental games payoffs are usually small sums of money (small enough not to make the cumulative result of up to 300 trials not too disastrous for either student subjects or experimenter).

Three important questions may therefore be asked, both of gaming experiments and of strategic thinking based on this approach: Do people behave the same regardless of utility values or dimensions in any situation having the logical structure of the Prisoner's Dilemma? Within the limits of small numbers of dollars, cents, candy and examination points it seems that they do; but there is no evidence on questions of ideology and instinct. Secondly, what are the complex dynamics of strategic thinking, the logics apparently employed by different subjects? Thirdly, assuming that people are able to do relatively complex rationalistic calculations required by strategic thinking in normal circumstances, can we assume that they make the same calculations in conditions of extreme stress (for instance, in a nuclear war)? Erich Fromm (1961) for one believes not.

It was hoped to begin answering the first of the above questions in

the experiment described here. An attempt is also made to unravel some of the dynamic factors in strategic thinking. The questions require answers before we can make attempts at generalising from gaming experiments to real-life social and political behaviour.

At some point we shall have to phrase the question: What conditions predispose which individuals or groups to flight or defence behaviour? The study of ordinary people in normal conditions, or even under extreme stress, may not be relevant to the study of political and military leaders at times of crisis: if their situation gets to the stage of of basic threats to their biological survival they are unlikely to have the political or military apparatus remaining with which to act.

Rapoport (1966) does not believe we should make such jumps from the laboratory to the real world of strategy. (Though he is "equally sceptical about the relevance of strategists' analyses to the rational conduct of international relations". (p.98.)) He believes that only "where the attention is focussed on the structurally essential aspects rather than allowed to roam in search of real life analogies" can "the rich promise of these methods" be fulfilled.

What I have attempted to do here is to focuss on the structural aspects of the psychology of the situation. It has already been shown that not all students behave in the same way in the same game; there are differences which seem to reflect personality, social and other factors. It is clear also that the structure of the game does affect game-playing behaviour. Though both the structure of the situation and the role of the actor are largely determined by forces outside the actor (the experimenter, society, etc.) in the last analysis it is the way the actor himself evaluates the situation and decides his role that are the important determinants of his behaviour. The way he structures the situation will depend on the information he has available; the role he plays will be determined by the significance of the situation as related to his value system. The value system is a complex function of personal, social and ideological values which together determine the utilities of the outcomes of actions.

In a psychological analysis, therefore, it is crucial to measure the values that the players put on the possible outcomes.

While some recent experiments, as we noted, have examined asymmetries in the payoffs to the players, strategic thinking has in general assumed symmetric situations. The approach has thus tended also to consider the players as equal and to assume that they thought in terms of the other player being like themselves. ('He is like me, therefore if I choose x he will choose x, therefore I must choose y, ... 'etc.) But no evidence has been presented that subjects do regard the partner in the same light as they regard themselves. The nature of B is not an irrelevant factor when A is trying to predict his behaviour. Bronfenbrenner (1961), for example, indicates the Soviets and Americans, far from having the same image of themselves as they have of the other, have mirror-images of each other. (To this extent the perceptions seem to be symmetrical.) The perception that A has of B is an extremely important variable in analysing his behaviour (e.g. Tagiuri & Petrullo, 1958). This perception will also depend on the information available (H & S) and will be coded into evaluative (good-bad) and cognitive (strong-weak, active-passive) aspects (e.g. Osgood, Suci & Tannenbaum, 1957), analogous to the probability-utility components discussed earlier in relation to the perception of situations.

If B is 'good' it makes a great deal of difference whether he is also 'strong' or 'weak','active' or 'passive'; if B is 'strong', it matters to A whether he is 'good' or 'bad'. In gaming experiments, such as PD, the reasoning could well be: 'The best thing would of course be mutual co-operation, where we both win; but since he is bad, he would surely choose to defect, so I would only lose if I chose C. Therefore I am forced also to choose D.'

This may also occur in 'real-life': 'Of course we are prepared to disarm, but since they are by all definitions bad, we should be foolish to do so and are forced to keep up our level of armaments'. In terms of psychological 'economics' this simple argument performs a major task. In the face of dangerous ambiguities it reinforces the self-perception that one is good, and it gives an apparently rational explanation of one's response in an irrational situation; the great psychological investment required to examine the basis of one's own position is therefore avoided.

We have emphasised the questions of information and communication, the evaluations that the players have of the situation and of each other, and how the behaviour of the players may depend on the social background. In the next section we shall point to some aspects of the real world which enormously amplify the importance of these factors in strategic thinking.

1.4. Strategic thinking in a stratified system.

In studies of national society it has long been the custom to classify persons or groups on the basis of their rank on a series of dimensions - age, income, sex, education, occupation, etc. Such factors may then be found to relate to things such as educational opportunity (e.g. Lindbekk, 1967) or attitudes to foreign affairs (Galtung, 1964, Halle, 1966). (Later, we relate some of these factors to behaviour in a Prisoner's Dilemma game (chapter 5).) Just as sociologists have pointed to the stratified nature of national society, some international sociologists have in recent years emphasised the class structure of the world community of nations.

Socioeconomic factors have not only a direct influence on the dynamics of society but have in addition a psychological component - prestige. It is not only developmental reasons that excludes the young and the old from much of our social life in Western society, it is because age gives prestige and status. It may be found that more women say they would like to be men than men say they would like to be women: we may then say that, operationally, being a man has a higher prestige in the given society (for methods of construction of such indices see Galtung, 1967). We then find that on the one hand the higher status people read newspapers and participate in organisations more than low status people (Galtung 1964 b); and on the other hand, that the mass media report the actions and opinions of higher status people more than low status people (Galtung and Ruge 1965). Galtung and Ruge analysing the presentation of the Congo, Cuba and Cyprus crises in four Norwegian newspapers find evidence for the hypothesis that a major factor in the transmission of foreign news is the fact that the further away a nation in status, the higher the status of a person in that nations needs to be in order to have his actions and opinions reported.[1] Östgaard (1965) reports a number of factors distorting the flow of foreign news. There is, in other words an almost complete lack of communication between the people of the tiers monde and the people and decision-makers of the Western world, with whose interests they may often be in conflict. Not only is the nature of the system a source of intense conflict, but the information flow is such as to lead to inadequate and distorted images on which to base strategic thinking.

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1. The present writer has suggested, in a private memorandum (1965), that newspapers sell because they resolve uncertainty: they also therefore have an interest in creating new uncertainty and for it to remain important to the reader, the sources of uncertainty must be relatively more powerful: hence the emphasis on the richest Latin-American or the biggest earthquakes. For reduction of uncertainty as a source of motivation see e.g. Berlyne (1963).

A number of studies indicate the extent of this problem. In recent years a massive attempt has been made to collect data on as many nations as possible and use these as independent variables in the analysis of the domestic and foreign behaviour of nations. In addition to the United Nations Statistical and Demographic Yearbooks, major sources are Ginsburg (1961; forty-seven indicators of economic development and under-development), Banks and Textor (1963; fifty-seven variables), and Russett, et al. (1964; seventy-five indicators). The primary result of these studies is to demonstrate the richness and complexity of international society. But while the statistical approach opens up the possibility of the systematic testing of hypotheses, the outcomes have so far proved inconclusive. Once, in the study of national society, there was disagreement over the relation of intelligence to social class. Now there is argument amongst students of international society over the relationship between domestic violence and foreign conflict. Haas (1965) finds a relationship between such indicators of domestic stress as high unemployment and high urban population density and foreign conflict. Feierabend and Feierabend (1966) find only a weak relationship between an index of frustration resulting from the system and external aggression.

An attempt to bring order into this confusing wealth of data by the process of factor analysis has been made by Rummel and his associates (e.g. 1966). The 1955 data on 236 characteristics of 82 nations were analysed, giving a primary factor structure of 14 dimensions (such as economic development, Catholic culture, political democracy); a secondary structure of five factors (eg. international rank disequilibrium (after Galtung, 1964a), and political stability); and two tertiary factors. The latter are difficult to give a label to, but Rummel (1967) suggests that the first indicates that "nations high in political stability tend to be low in rank disequilibrium, i.e. domestic stability is correlated with international rank equilibrium", and the second third order pattern "shows that dense nations high in political democracy (first order dimensions) have a tendency to be diverse linguistically and ethnically, to have a more equal land distribution, and to be above subsistence levels". (p. 298).

This final factor illustrates the major problem in such studies: it is not possible to determine a causal relationship, so that there is a danger in the 'factors' reducing to tautologies. This problem may be partially resolved when trends in data over time can be analysed. Some attempt to do this using a few dimensions only (e.g. proportion of national budget spent on armaments, foreign trade) has been made by Richardson (1939, 1960) and Smoker (1964, 1966).

However, here we wish to point to a more concrete finding from Rummel's data. This was that the first order economic development factor was the largest in terms of the number of characteristics it included. "Thus implies that economic development is the single most important source of variation in the internal structure and foreign behaviour of nations" (Rummel, 1967, p. 198). The economic development pattern included internal characteristics such as agriculture, arts and culture, communication, demography, economic, educational, geographic, health, political, science and technology, social, transportation and values; and external characteristics such as collaboration, international communication, diplomacy, membership of international organisations, population movements and trade. It did not, significantly, include such characteristics as history, domestic conflict, foreign conflict, colonialism, political geography or international politics. Domestic and foreign conflict came out not only as distinct patterns in themselves but proved to be unrelated to each other as well as to the non-conflict internal and external characteristics of nations.

Galtung in his structural theory of aggression (1964) has suggested that nations may be assigned a series of top-dog and under-dog statuses - just as is done with persons on his social position index (see Chapter 5). Since these factors tend to correlate we may, with a considerable degree of justification, divide the world into top-dogs (T) and under-dogs (U). Galtung's theory is that there is a struggle to equilibrate statuses on all dimensions. Thus a nation that may be TTU (say, high in economic development, high in foreign conflict, low in power) wishes to become high on all three dimensions (TTT); the struggle to become a top-dog on power results in aggression. Rummel claims to have found just such a factor in his data, which he regards as empirical confirmation of Galtung's theory. However, inspection of the data presented in his summary article (1967) fails to reveal such a group of nations. Indeed the only group of nations (out of 82) classified as 'conflictful' are also 'economically-developed powers'. They number two - the United States and the Soviet Union.

Haas (1965) also concludes in his survey of several studies that the rich countries have more foreign conflict than most of the economically under-developed nations of the world. This is confirmed by Feierabend and Feierabend's (1966) more recent study using data from 1948-55 where the effects of the "over-riding demands of international relations in the case of the major powers" (p.36) had such an influence on their results that they excluded Britain, France, China the United States and the Soviet Union from the final analysis.

The date of the data used in these studies illustrates another problem: the difficulty of generalising to contemporary events and political processes. Since 1955 the number of independent nations has increased enormously (as of October 1967 there are 122 members of the United Nations). The French, British, Dutch and

Spanish colonial empires have all but vanished, forcing these powers to carve out a new relationship between themselves and the rest of the world. In addition, since the Cuba Crisis of 1962, and the development of Chinese nuclear potential, the relationship between the two major powers also seems to have undergone a change. The popular feeling seems have been growing in the West that the sources of conflict in the world are not now between East and West, but between the new nations of the South. Thus, in 1964/5 in Norway, France and Poland, 'world war' was going out as an issue of public concern, and 'hunger, poverty and over-population' were coming in (Halle, 1966).

The belief in the relationship between poverty and conflict is given some support by Secretary of Defence McNamara in a speech in Montreal (quoted in Reay, 1967). McNamara showed that since 1958 there had been only one major upheaval amongst the rich nations (using the World Bank classification). Amongst the 38 very poor nations there had been 64 violent domestic conflicts. The number of outbreaks of violence was increasing each year, almost doubling in number between 1958 and 1966. Of 149 serious internal insurgencies since 1958, the Communists had been involved in only 58, and in 7 of these they were themselves the regime that was the target of the insurrection.

Thus we have an image of the world, apparently valid on data up to 1955, and probably essentially the same for a long time after that, which may be exemplified as follows:

	subsystem 1	subsystem 2
high status	T	T
low status	$U_1, U_2, \ldots U_n$	$U_1, U_2, \ldots U_n$

Galtung (1966) has suggested that in such a situation, contact between the two blocs will be primarily between the two top-dogs, with some contact between a T and the Us in the other bloc and very little contact between the Us of each bloc. Data on 15 kinds of communication (eg. exchange of diplomatic notes, trade agreements, cultural exchange) between the NATO and Warsaw Pact lands confirms the hypotheses in almost every case at the governmental level, but seems to disconfirm the hypotheses at the non-governmental level. The feudal nature of the links within such blocs has been shown by Schwartzman (1966) and Galtung, Araujo and Schwartzman (1966). Galtung (1966b) has also made a more complete theoretical formulation of the situation. Schwartzman and Araujo (1966) have also related the socioeconomic level of the nations in the Latin-America system to their prestige, as rated by students from the various lands. They showed that the image of the stratification was more dependent on the generalised rank-role of the

nations than on specific knowledge of economic level, size, etc. That is, not only do such groups of nations have hierarchical relations on objective indicators, but they are perceived to have such a status stratification by the people living in them. At the conscious level there was an exclusive concern amongst the sample of students with accessible elements such as industrialisation and education and a refusal to admit that they were using ascribed characteristics of rank. This contradiction between values and actual behaviour is interpreted as being related to the transition of the international system from a feudal-like to a class-like structure. It is precisely such ascribed characteristics that affect the selection and transmission of news from the 'poor' to the 'rich' nations.

Much of the conflict in the poor nations seems due to the attempted overthrow of the feudal leaders by other would-be feudal leaders from the same class (if not family) in hope of preventing the overthrow of their class/family by more popular forces (see Fossum, 1967). Such conflicts become of international concern (and of concern to Secretary of Defense McNamara) when they involve the financial, political or strategic interests of a great power. Because of its economic, military and political involvement, particularly in Latin America and South-East Asia, and to a growing extent in Africa and the Middle-East (Horowitz, 1967) the United States has shown that it is the only Power capable of, and prepared to, intervene military or paramilitarily in any part of the world

Of concern here are not the political aspects but the psychological aspects of the resulting strategic situation. The changing nature of the international system seems such as to bring into prominence strategic situations not between great Powers, or blocs, which although hierarchical in structure have relatively balanced relationships, relatively good communication, experience in the modes of interaction and a mutual interest in maintaining the stability of the system. In the 'new' world it is the feudal structure within the blocs which is breaking down, resulting in a strategic situation where the communication channels are one way (from T to U), where the relationship is one of traditional dominance and submission, where one of the parties wishes to reconstruct the system, so that there is neither mutual interest in the stability of the system, nor experience in interacting in the new relationship, perhaps not even a clear idea of what the new relationship should be. The greater the 'gap' between rich and poor, the more assymetric this situation will become.

When we relate this situation to the model we have been proposing, the following points become clear. First, the flow of information is predominantly

from the top-dog to underdog. Because of the structural filters built into the news-communication system, the top-dog has extremely limited information about the values and ectivities of the under-dog. Harrison Salisbury (1967), the seasoned New York Times journalist, noted on his way to Hanoi:

> "Who in America knew anything of Vietnamese Communism, of the nature of its regime? We possessed a few secondhand accounts from the French who had experienced the movement in its Indo-China phase; we had some scholarly studies and a number of propagandistic and self-serving books written either to justify American policy or to glorify Ho Chi Minh. But our ignorance was abysmal. And on China the depth of misunderstanding was, if anything, even greater." (p. 6, emphasis added.)

Later Salisbury says:

> "And before I left North Vietnam I was convinced that the nature of the (National Liberation) Front, and specifically of its relationships to Hanoi and its probable role in a postwar Vietnam, had been badly misunderstood in the United States. .... I found to my amazement that my ignorance of the Front's program and policy was shared by American officials with basic responsibility for our Vietnam policy." (p. 142, emphasis added.)

Where countries, such as North Vietnam, have been essentially cut off from the rest of the world, this is likely to add to the extent of the misunderstanding. But is easier to get information about a large nation than it is to get it about a small one (especially where the small one does not publish official statistics).

Secondly, it is extremely difficult to imagine a payoff matrix which can adequately encompass the range og disparate values and available actions of the parties in a conflict such as that in Vietnam. The failure of one much-heralded American strategy after another ('pacification', 'escalation',) seems to suggest that the parties are acting according to totally different rules and totally different sets of values.

Rummel (1967) pointed out the significance of economic development in explaining other characteristics of nations. Reay (1967) notes that on some estimates, while the per capita income in the U. S. may rise from $3,000 to $4,500 between now and the end of the century, in the poorest half of the 'developing' nations per capita income on present rates of growth will rise from $120 to $ 170 by the year 2,000. There seems to be no possibility of changing this difference significantly by any means acceptable to the rich nations. Widespread famine is predicted for dates between 1975 and 1985 by the U. S. Department of Agriculture (quote in Bonner, 1967), Bonner (1967), Paddock & Paddock (1967), Dumont & Rosier (1966). The Paddock brothers suggestion is that the United States should give all-out economic aid to the limited number of nations with a chance of survival and abandon the rest.

Dumont (1967) has pointed out that whereas in 1936 the Third World was exporting 36 million tons of wheat, and in 1966 it was importing 11 million tons, by 1980 there will be a deficit of 150 million tons. But he estimates the cost of producing sufficient natural and artificial fertiliser to make up this deficit to be approximately 6.5 billion (milliard) dollars - only one quarter the amount the US is spending on the Vietnam war in fiscal year 1967. The choice is one of politics, not of charity.

In a recent study of the 'peace-thinking' of the Norwegian political and foreign policy elite, Hveem (1967) shows frequent differences of opinion between the stortingsmenn (members of parliament) and the men in the foreign service. (E.g. the stortingsmenn identified more with the United Nations and the Nordic group, the foreign service men more with the Atlantic Pact and the European Economic Community. The stortingsmenn were predominantly old and Labour Party, the foreign service young (under 45 years) and Conservative Party.)

In another study Hellevik (1967) has shown that the social position of the stortingsmenn in the Norwegian parliament has no relation to their position in parliamentary committees except in the foreign policy committee. In this case there was a strong relationship between utenrikskommiteen membership, having a higher income, higher occupation, higher education, living in a metropolitan area, etc., Foreign policy in other words is conducted only by top-dogs of nations.

At the same time Jacobsen (1967) has shown that the Scandinavian countries between 1956 and 1963 were voting more and more with the rich 'Northern' countries against the poor 'Southern' countries.

Given the growing plight of the tiers monde, there seems to be a lack of information, awareness, political responsibility (given the dependence of the rich countries on the raw materials and food produce of the poor countries - see e. g. The Oxford Economic Atlas of the World, 1965) and sense of urgency in the rich countries (at least in the West). This situation would seem to be of the utmost significance for any attempt to discuss 'strategic thinking'. No theory of strategic thinking can be adequate unless it can cope with these discrepancies between idealised 'players' in a symmetrical 'game' and the realities of international politics.

In summary we are suggesting that strategic thinking may be quite fallacious if it is based upon mistaken assumptions about the nature of the opponent. Much current thinking has developed out of the 'cold' conflict of big Powers; the opponent is defined accordingly. When the opponent is the peasant of Vietnam, this strategic thinking may be irrelevant and disastrously erroneous.(For an analysis of misperception in the Vietnam War, see White 1966). It is not adequate to look for a big Power (China) to fill the vacant lot in an untenable cognitive structure of the situation.

From the strategic point of view it matters greatly whether T_1's opponent is T_2 or U_2. Not only is T_1's strategic thinking based on the assumption that T_2 is the opponent - the low rate of interaction between T_1 and U_2 means that both have little evidence on which to base their perceptions and predictions of each other. T_1's assessment of the effect of his actions on U_2 therefore may be quite mistaken; the limited feedback, far from acting negatively on the system to stabilise it, may act positively, producing ever-increasing distortions in perceptions, more and more inappropriate actions. The situation may degenerate to the stage where behaviour becomes almost random in the anxious hope that <u>something</u> may bring about the desired effect.

In such situations it becomes of peculiar importance to find ways of analysing the strategic situation as <u>perceived by the actors</u>. This means taking into account not only the purely military aspects traditionally regarded as 'strategic', but such less tangible elements as the opponents' perceptions of each other, the value systems according to which they judge the utilities of the possible outcomes, the structure of the conflict situation in which they find themselves, and the modes of strategic thinking which they bring into it.

We cannot hope here to make a thorough study of these many aspects. What we attempt to do is to demonstrate methods for measuring values and perceptions of the actors in an experimental situation in a 'developed' society, and in a field situation in a less-developed society. Only with measurement comes prediction and control, and it is essential, for the reasons stated above, that more objective measures, applicable across widely diverse cultures, be brought into the study of international behaviour.

1.5. A note on politico-military devices in strategic thinking.

We have chosen here to regard strategic thinking as a general phenomenon, inherent in the nature of human relations. Political and military strategic thinking are regarded as subclasses, albeit particularly important ones. In passing we shall point to some of the methods which have been extensively used in these areas.

1. Rigid kriegspiel. The original 'war games', much used by the Prussians, had elaborate rules for the various aspects of the mock war - such things as troop movements, casualties, fatigue, effects of weapons, etc. They would usually take place on a map, making clear the 'geography' of the 'battle field', and could be scored, the winner and loser being determined by the number of points. The validity of such games depends on how closely the rules relate to an actual war. Training officers by such methods does not necessarily enable them to adapt readily to situations not foreseen by the rules or to enemies not acting according to the same set of rules. Free kriegspiel is a version which utilises the judgment of experienced officers, rather than rules, in evaluating the game.

2. Crisis games. Crisis games are a more recent development, though both the Germans and the Japanese are known to have used them before World War II (Davis, 1963). These games rely much more on the role-playing of two or more actors, and attempts to simulate the geographical environment may take second place. Again the validity is limited, since it is clear that the role assumed by the 'enemy' actor may be false. This is illustrated by a recent suggestion to overcome the problem, common to a number of contemporary conflicts, of civilians on the battle field: groups of soldiers should be assigned the role of civilians in military manoeuvres. Clearly, since part of the soldier's training is to accustom him to being under fire, since these "civilians' remain under military discipline, are not subject to rape (since they will all be men), torture or other indignities, nor faced with the destruction of their families, homes, and livilihoods, the similarity with real civilians caught up in modern warfare is minimal. Since civilians are a major factor in 'people wars', the crisis game as a means of planning counterinsurgency is decidedly limited. It is even more so where the civilians (and the insurgents) belong to radically different cultures and circumstances from the military elites of great Powers.

3. Scenarios are attempts to take a given situation and imagine all the possible developments. They may also be used as a background for war games and

simulations. The scenario is perhaps best seen as a way of foreseeing possibilities; it is another question to assign probabilities to these possibilities. Alternative scenarios may be compared to see which seems most probable when discussed by a panel of experts. (Thus the scenario of the recent film 'The War Game' imagined a situation arising from the Vietnam war which led to a Russian limited nuclear attack on the U. S. Airforce base at Manston in Kent. At a conference in 1965 (before 'The War Game' was completed) a group of people with some degree of political and strategic sophistication (the U. S. Ambassador to the Geneva Disarmament Conference, the strategic advisor to 'The War Game', and others) could not, after many hours, construct a 'scenario' of 'how we get Johnson out of Vietnam' which was nearly as convincing as that with the consequences illustrated in 'The War Game'. Military reviewers of the film were not always convinced by the scenario; they have not yet suggested ways out of the Vietnam conflict which seem realistic.)

4. Simulation. Simulation may refer to the construction of logical or mathematical models, of which computer simulation is a main subclass. The attempt is made to define the relevant variables and incorporate mechanical and stochastic processes. The approach is more concerned with processes rather than the environment or the human agent. Such techniques are probably the only ones with any degree of suitability for planning global strategies a decade or so ahead. Linear programming, Monte Carlo and gaming techniques can be incorporated to estimate the long-range 'cost-effectiveness' of weapons systems, etc. (see e.g. Quade, 1964). However, as Bock and Berkowitz (1966) point out, it is not clear that such methods have any relevance for broader problems than those of comparing alternative weapons systems. choosing alternative site for military bases, etc.

A special type of simulation has been developed in recent years (Guetzkow, et. al., 1963) designed to study certain facets of international political processes, rather than purely military aspects. The technique employs subjects who play the roles of a number of national decision-makers in a 'world' of some five or eight 'nations'. The economic level, growth rate, etc. of these nations are given along with the size and population. Actions between nations are open to choice (e.g. they may make trade agreements, political alliances, wars,) within repeated limited time periods, which serve to condense real time. There are restraints on these actions due to economic factors, consumer satisfaction, etc., which if exceeded may result in the 'aspiring decision-maker' coming to power by election or revolution. There are other elements built into the simulation such as 'International Organization' meetings and a 'World Times'.

The Inter-Nation Simulation (INS) is particularly useful for educational purposes, but has also been used to study strategic doctrines (Crow, 1963), some aspects of personality such as risk-taking, authoritarian nationalism andaggressive militarism (Crow and Noel, 1965), and to 'repeat' the events leading up to the First World War using subjects matched and unmatched (as far as possible) with the Great Power leaders in 1914 (Hermann & Hermann, 1962). The world situation depicted may be hypothetical or based on an actual situation, such as Vietnam (Macrae & Smoker, 1967). A current study using an abstract situation is being repeated in the U. S. A. Japan, Maxico and Norway in order to study cross-cultural differences. The basic model is at present being revised and extended to enable more precise study of the nature of the international processes involved (Simulated International Processes Project, Northwestern University).

The validity of the INS model as representing the real world is of course open to doubt. In addition, as a research tool, the method is faced with the difficulty that the considerable expense, number of subjects, data-processing facilities, etc., required mean that insufficent repetitions can be carried out to enable clear patterns to emerge in the results. Nevertheless, since the technique has undoubted value as an educational device for the increasing numbers of students of political science, international relations, etc., as well as younger diplomats and others, it may be that in the years to come there will be sufficent simulations carried out to enable some systematic research exploitation. For a long time to come simulation will remain tantalising since the fascinating richness makes it impossible to grasp all the sources of variance.

It seems that experimental gaming is considerably more sophisticated scientifically, as Inter-Nation Simulation is considerably more complex politically and economically, than any of the traditional methods of military planning. The problem of validity, however, seems almost as bad in the one case as in the other. As Davis (1963) says, referring to the military use of gaming and simulation, "We cannot ignore (the problem of validity) much longer".

The approach here is to try, by using the more rigorous experimental games, to unravel the underlaying dynamic processes involved in strategic thinking. Where we have used 'real-life' illustrations it is as examples of what might be possible at a later stage, when the validity of the resulting hypotheses is proven.

2. AN EXPERIMENTAL STUDY USING CONTROLLED INFORMATION TRANSMISSION.[1]

2.1. Design of the experiment.

The type of gaming experiment featured in the literature has a major advantage which has attracted little attention: it provides a reasonably interesting situation in which there is an exact measure of the information transmitted between the players, an extremely valuable but unusual circumstance.

In the Introduction the need to reduce uncertainty in order to act was emphasised. Special problems are involved where reduction of uncertainty requires communication with another individual or group. One major factor facilitating communication in a dyad is what Triandis (1960) calls attribute similarity. It is precisely a lack in such attribute similarity which we pointed to in the last chapter with reference to the international system. Rommetveit (1955) argued that an acquaintance with the other person's dimensions of categorisation is necessary to permit communication. Triandis (1960) also concludes that communication is more effective when there are shared norms.

Hammond and his associates (Hammond, 1966; Todd, Hammond & Wilkins, 1966) have developed an experimental technique for studying the effects of induced cognitive differences in communication. In the present experiment the structure of the problem is clearly presented to both parties, but behavioural norms are established during the course of the experiment.

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1. This experiment was reported in Lumsden, M., 'Perception and Information in Strategic Thinking', Journal of Peace Research, 1966, 257-277. The research was performed while the author was Research Fellow at the International Peace Research Institute, Oslo. Some of the results were presented at the Second Nordic Peace Research Conference, Hillerød, Denmark, February, 1966. The author wishes to thank Finn Tschudi and Hilmar Nordvik of the Psychological Institute, University of Oslo, for their co-operation, and Herman Ruge of the Norwegian Central Industrial Research Institute, for assistance in the design and construction of apparatus.

Toda (1956) points out that communication theory, developed for engineering purposes, is inadequate as a theory of actual human communication. He summarised his arguments as follows:

> "(a). Human communication is a kind of game, sometimes co-operative and sometimes competitive.
> (b). The receiver's rules of decoding are not usually given; they should be developed by the receiver himself for each different information source.
> (c). The receiver may extract more than one information content from the signal ("multiple information extraction").
> (d). The receiver is usually not given objective probabilities but he estimates them. Accordingly, the amount of information and the information content should be defined with respect to subjective probabilities. Particular attention should be given to the problem of information synthesis." (Toda, 1956, p.212.)

Communication is fundamental to most aspects of human existence and as such cannot be examined in detail here. (See, for example, Matson & Montagu, 1967.) The complexity of human communication may lead to problems of information processing and storage (see Fields & Abbott, 1963). Miller (1963) discusses a number of studies of channel capacities in human information processing and suggests a number of mechanisms of adjustment: ommission, error, queueing, approximation, multiple channels (and decentralisation) and escape. At high rates of transmission of information preference seemed to be indicated for filtering and ommission. Smoker's (1967) study suggests such factors operate at the international level. Indeed, Miller gained an 'overall impression' that channel capacity decreased from cells to organs, to individuals, to groups, to social organisations. Marschak (1964) reports experiments which tend to confirm that the basic postulates of decision theory are only actually obeyed when stress is absent (e.g. when memory is not overloaded, ample time is available, etc.) and "above all, when, and only when, the structure of the problem is very simple and is laid bare, by the use of syntax, tabular presentation, etc." (Marschak, 1964, p.104).

'Laying bare' the structure of complex international problems may be possible with game theory (see Chapter 3) but in the present experiment such problems are avoided by the restriction to structurally simple situations which are clearly presented to the subjects, in the form of the payoff matrix. Only two bits of information are required for any individual trial, and

although the trials were repeated after 10 second intervals, this should be well within the capacity of the subjects. Obviously recursive reasoning of the "If I . . . , then he . . . , then I . . . "type would require more time, but as pointed out in the last chapter, there seem to be limits to only two or three such cycles and it is not time that is the major barrier.

The problem with which the subjects are presented in a gaming experi- such as the one described here is not that of over-coming information overload but simply that of predicting on the basis of his behaviour the choices of the other player. The information available comes firstly from the payoff matrix. This is constant during the game and so provides no additional information. Secondly, in the case of the Prisoner's Dilemma it is not possible to predict behaviour from the matrix (as it would be in a matrix where one outcome was the most preferred to both players - the case in two of our games). The subjects are kept <u>incommunicado</u> during the experiment. The pattern of responses over repeated trials of the game therefore provides the sole information on which to base predictions of the other player's choices.

The resulting situation - learning to predict another person's actions - is one which, as Hammond (1966) points out, has received little research attention. Many psychological experiments have been carried out in two-choice situations, analogous to that here, both with human and animal subjects. Perhaps the T-maze (e.g. Hull & Spence, 1938) is the most well-known example. However, the uncertainty has been due to the experimental situation, or the experimenter, not to another organism. Rats, for example, can learn on which side of a maze there is food. The experimenter may change the food from side to side on a random basis representing some predetermined probability, and the rat's learning curve approaches an asymptote approximating this probability (Bush & Mosteller, 1955). Human subjects can also learn probabilities of a set of outcomes, even where there is no 'reward'. for one choice rather than another.

In the present experiment the subjects are faced with a two-choice situation, with both negative and positive reward possibilities with less than 1.0 probability. Thus many of the formal properties of learning experiments are present. However, each of the two available choices may result in either of two outcomes, because of the independent choice of the

other player: the situation is strategic. For this reason, no clear learning curve of the traditional type may be expected. The reason for this is obvious: the responses are not a true measure of the 'learning' of the individual, since as soon as the behaviour of one of the players becomes predictable, the partner may exploit him. Each player may change his behaviour at any time, obscuring any 'learning'curves. Nevertheless, there are consistencies in the data, and Rapoport and Chamnah (1965) report attempts to fit stochastic models to the resulting curves.

However, strategic thinking requires feedback of information, which is not available until after the first trial. It makes sense to ask questions about the first trial and then about the learning that the feedback from the first trial results in on the second trial.

On the first trial, where there is no other information than the structure of the payoff matrix, and where both available choices may result in a win or a loss, we might predict:

$H_{1.0}$: The mean probability of each choice on the first trial will be .5.

On the second trial we are faced with a number of alternatives. First we may take $H_{1.0}$ and use it as a null hypothesis, implying that the choices continue to be random:

$H_{2.0}$: The mean probability of each choice on the second trial will be .5.

It is well-known that rats in a two-choice situation such as the T-maze alternate from side to side (though lesions of the septum may cause them to perseverate the first response (see Dalland, 1967)). The same might apply here:

$H_{2.1}$: The mean probability of each choice on the second trial will be .5 but this will represent not a random distribution but a change of all C choices to D choices and vice versa; i.e. the probability of C following C will be 0.0, and of C following D 1.0.

Since there are rewards and punishments we might expect, on the basis of another large area of learning psychology, that a gain on the first trial might reinforce that response so that it would be repeated on the second trial. Conversely, a loss might result in a change of response in the second

trial.

$H_{2.2}$: Those Ss who gain on the first trial make the same choice on the second trial; those Ss who lose on the first trial change their response on the second trial.

We have emphasised here the strategic nature of the situation and the need to make predictions about the partner's choices. If a player's own behaviour is random ($H_{2.0}$), changing according to a simple rule ($H_{2.1}$), or changing according to 'effects' thinking rather than 'process' or 'causes' thinking (Cooper, 1965,1966), then he will not be able to make the maximum use of the information available. A much longer sequence of responses will be required to establish regularities in the other's conditional behaviour if the subject's own responses are changing. It will thus also be longer before the player is able to establish some control over his gains and losses. Since of the two bits of information transmitted on average one is provided by the subject himself, holding his one behaviour constant would enable him to get the maximum information about the other's behaviour. On the other hand the player cannot afford to do this for long, since his behaviour will then become predictable to the partner and may be exploited. However, on the second trial there is still hardly a basis for predictability of the player's choices by the partner, and the player could safely keep to the same choice in order to maximise the information from the other player.

$H_{2.3}$: Whatever their choice on the first trial, and regardless of whether they made a gain or a loss, Ss make the same choice on the second trial.

The probability of subjects repeating the same choice we should expect to become less and less as changing their own responses is the only way of exploring the behaviour of the partner, and of maximising the payoffs accruing.

In this experiment subjects played four games, two of which (Prisoner's Dilemma and Chicken) were played for small money payoffs, and two were played for imagined personal and political values, on the basis of stories (Resistance and Cuba) intended to match the structure of PD and Chicken games, but with payoffs on a different scale of values (see Chapter 3). Measures of Ss perceptions of each other were taken at the end of each game (Chapter 4) and they also completed a questionnaire on their social position and attitudes (Chapter 5).

2.2. Procedure.

In this experinent 30 psychology student subjects played 100 trials each of the following games:

1. Prisoner's Dilemma.

		Player B	
		C.	D.
Player A	C.	5, 5	-10, 10
	D.	10,-10	-5, -5

2. Chicken.

		Player B	
		C.	D.
Player A	C.	5, 5	-10, 10
	D.	10,-10	-50,-50

(The first payoff in each cell is that to Player A, the second to B.)

It can be seen that the only difference between the two games is that the 'punishment' for not co-operating (the DD outcome in the lower right cell) is increased ten-fold in the Chicken game, making it worse than the 'sucker's' payoff (CD).

The subjects also played two other games, which we shall call Cuba and Resistance. In the latter, the subjects were asked to imagine themselves as political prisoners in an occupied country, where each was an important member of a rival resistance group. The intention was to model situations found in such countries as France, Greece and to a lesser extent Norway during the Second World War. (In Norway the conflict between Communist and non-communist resistance groups seems to have been played down to the extent that the younger generation is hardly aware of it, which may be a

factor in our results.) The two prisoners were kept in separate cells (and in separate rooms in the experiment) and offered release if they would inform on the activities of the other group; a prison camp if they both informed; death for the one who did not inform; and a regular prison sentence if neither informed. The subjects were asked to rate these various outcomes on an 11-point scale (see Chapter 3). The intention was to use the original Prisoner's Dilemma paradigm but give it a political slant.

Similarly, the Cuba game attempted to give a political slant to the Chicken situation. In this case an analogy to the 1962 Cuba crisis was presented where each player was asked to imagine that he was the key decision-maker of a great Power, where both had made an ultimatum which was due to expire. At zero-hour they could either keep to the ultimatum - to launch a major military attack with a high probability of nuclear war - or back down; because of domestic pressure the latter was a serious political risk

In each of the four games choices were indicated by pressing or not pressing a switch, which lit a signal lamp on a panel in front of each subject and the experimenter. An additional lamp, of a different colour, was flashed by the experimenter to indicate when the subjects should make a choice. While the choices were being made the current in the whole circuit was cut, so that the outcomes were shown simultaneously to each player at the expiry of the choice period by restoring the current in the circuit. The subjects were placed in separate rooms without knowing who the other player was. Thus procedure was adopted because a measure of their perceptions of each other was also required, determined solely by the response pattern (see Chapter 4).

The subjects were matched for sex (except for one pair, due to uneven numbers) and played all four games. Chicken and Prisoner's Dilemma were played first (in random order) followed by Cuba and Resistance (in random order). The games were played for 100 trials each, except in many instances of Cuba and Resistance where the games were terminated after the first 30-40 trials had resulted in CC outcomes. (The reason for this result, as we shall see, is because subjects rated the CC outcome highest, so there was no motive to defect.) For the first two games payoffs were in small sums of money (Norwegian öre, equivalent to approximately 1/100 sh. or 1/7 c.) which

was paid out at the end of the expdrimental session. In cases where the subjects made a nett loss, they were asked to contribute to a fund for a class Christmas party.

In order to get the two subjects to the laboratory without them knowing who the other one was appointments were made secretly and one of the pair came 15 minutes before the other one. In this 15 minutes he completed the questionnaire of social position and attitudes (Chapter 5). The other subject filled out the questionnaire at the end of the experimental session.

Subjects first completed the ladder scales of the Cantril Self-Anchoring Striving Scale, which was later used to rate the outcomes in the Cuba and Resistance games. They also rated their perceptions of themselves on 16 scales of a Semantic Differential, which they repeated at the end of each game, along with a rating of the other player. Thus they were familiarised with the measuring instruments before the beginning of the gaming session.

The payoff matrix was explained to the subjects and was before them in each game. In the case of the Cuba and Resistance games the ratings of the four outcomes on the Cantril scale were transferred to a payoff matrix analogous to that in the first two games. (However, the ratings of the other player were not known and had to be assumed by the players. They were of course known to the experimenter.)

Further details of the experiment may be found in Appendix 1.

2.3. Results.

Figure 1 shows the proportion of C (co-operative) choices in each block of ten trials for each game. Differences in the games are clearly shown. There appear to be no clear signs of 'learning' to co-operate, but this is not surprising given the complexity of the dynamics and the small sample. There does seem to be a slight trend in the direction of more C responses, though a drop towards the end suggests an attempt by the subjects to vary their choices, perhaps as a result of boredom.

Increasing the 'punishment' for the DD outcome from -5 öre to -50 öre

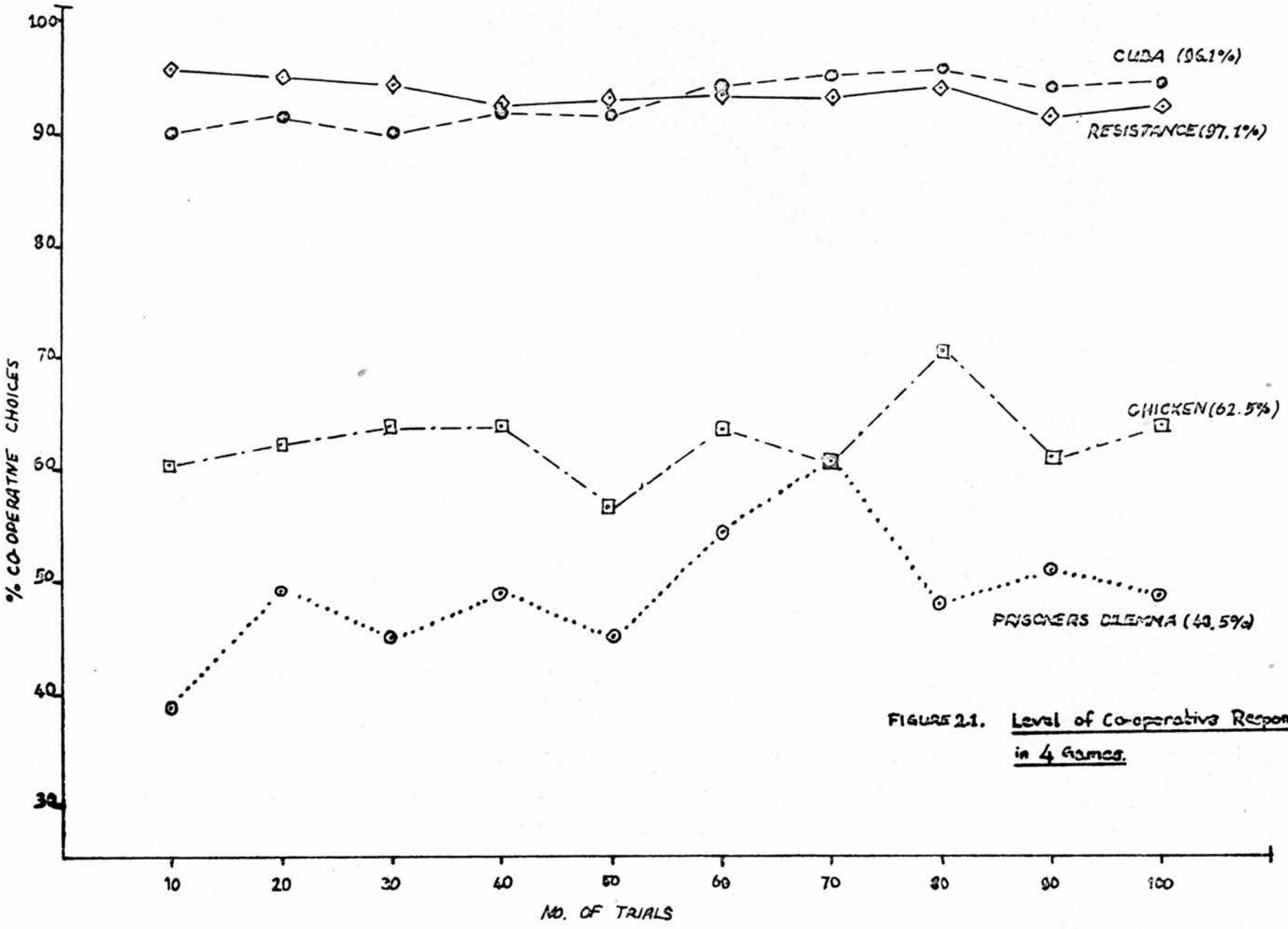

FIGURE 2.1. Level of Co-operative Responding in 4 Games.

TABLE 2.1. Response characteristics of 30 subjects on 100 trials on each of four non-zero-sum games.

	Prisoner's Dilemma.	Chicken	Resistance	Cuba
1. Mean % C on trial 1:				
Men	58	74	100	82
Women	36	36	100	100
Total	50	60	100	93
2. Mean % C over 100 trials:				
Men	52.5	67.2	95.8	97.2
Women	41.6	58.9	100.0	95.3
Total	48.5	62.5	97.1	96.1
3. Conditional probability of C:				
(i) After CC				
Men	.67	.65	.90	.93
Women	.53	.58	.32	.79
Total	.60	.61	.86	.86
(ii) After CD				
Men	.41	.45	.96	.80
Women	.32	.47	--	.37
Total	.36	.46	.96	.59
(iii) After DC				
Men	.50	.59	.76	.47
Women	.35	.57	--	.79
Total	.42	.58	.76	.63
(iv) After DD				
Men	.39	.61	.76	.96
Women	.33	.63	--	.95
Total	.36	.62	.76	.96

(and hence changing the PD game to a Chicken game) had the effect of increasing the mean percentage of C responses from 48.5% to 62.5%. The Cuba and Resistance games were obviously played quite differently (see Chapter 3).

Table 2.1 presents in addition to the mean % C on the first trial, and over 100 trials the conditional probabilities of choosing C following CC, CD, DC, and DD on the previous trial. The figures are presented separately for men and women to enable comparison with other studies (e.g. Rapoport & Chamnah, 1965; Dencik & Wiberg, 1966). No reliability can be placed on these figures in the case of the Cuba and Resistance games, since there were so few cases of CD, DC and DD outcomes. In the Chicken game the probability of choosing C following DD increased considerably for both men and women, but other changes are slight. Thus the increased punishment for joint defection while it had the effect of an overall increase in co-operation seems to operate at a simple 'effects' level, rather than changing the logical structure of the game as seen by the subjects.

Table 2.1 shows the results for each game regardless of the order in which they were presented. In order to test our hypotheses about the choices on the first and second trials it is necessary to take the results on the first two trials regardless of game. This is done in Tables 2.2 and 2.3.

TABLE 2.2. Results on the first and second trials of the first game (N=30).

No. of Ss who chose C on the first trial	15
No. of Ss who chose C on the second trial	11
No. of Ss who changed their choice on the second trial	8
No. of Ss who won on the first trial	15
No. os Ss who lost on the first trial	15

TABLE 2.3. Choice on the second trial as a function of win or loss on the first trial.

		Result on trial 1. Win	Loss	N
Choice on trial 2.	Change	4	4	8
	No change	11	11	22
	Total	15	15	30

We see from Table 2.2 that exactly one-half of the subjects chose each of the available choices on the first trial, a result which supports $H_{1.0}$, namely that in a new and indeterminate situation, choices will be random. The hypothesis cannot be applied to each of the games individualy in this experiment since all the subjects played all the games, so that only on the very first trial of the first game was there a total lack of experience of the situation and of the other player's choices.

Table 2.2 also shows that the choices were not evenly distributed on the second trial since 8 of the 30 subjects had changed their choice - five from C to D, and three from D to C. However, as Table 2.3 shows four of these had won on the first trial and four had lost. The probability of only 4 out of 15 cases changing by chance is 0.59 - which hardly supports $H_{2.0}$, though it does not quite allow us to reject it at the 5 per cent level.

There is no evidence for the 'alternation' hypothesis, since only 8 of the 30 subjects changed. Similarly, since 4 out of 15 who won on the first trial as well as 4 out of 15 who lost changed their choice on the second trial, there is no support for the 'reinforcement' hypothesis ($H_{2.2}$). The best support is for $H_{2.3}$ since, as we saw under $H_{2.0}$, there is less than a 6 percent chance of 22 cases out of 30 choosing the same on two successive trials.

2.4. Discussion.

In the Introduction the importance of the need for information in strategic thinking was emphasised and we believe some indication of this is given in the above result. The information-seeking component of experimental games has not been studied systematically, since it is usually assumed that all the information is available in the matrix and that otherwise 'no communication is allowed'. Some form of verbal communication turns the game into a bargaining situation, since the players can then come to an agreement on how to distribute the payoffs, even though there is no means of enforcing such an agreement. In Prisoner's Dilemma games manipulation of their choices is the only means available to the players of exploring the intentions of each other.

In the research reported here it has been the policy as far as possible to keep parallel field and experimental studies. Controlling information in the field is obviously impossible, but the two areas studied in the field were chosen because there did appear to be quantitative and qualitative differences in the amount of communication between the parties in these two places (Limassol and Nicosia, a provincial town and the capital of Cyprus, respectively). In Limassol there had been relatively little fighting between the Greek and Turkish communities, there were no physical barriers between them, there were functioning administrative relationships, and areas where the two communities were spatially interwoven. Because of the small number of 'incidents' there was also little UN activity.

In Nicosia by contrast there was a physical barrier, manned by three rows of armed men (Greek Cypriots, Turkish Cypriots, and the UN Force in between), a political separation of the communities, considerable tension and overt fighting, no official contacts - and considerable UN activity.

We were not of course in a position to determine how much each side tried out various strategies and tactics purely to test the intentions of the other side. However, it was believed that there would be relationships between the amount and type of contact and the perceptions that the parties developd of each other, just as in our experimental situation. These aspects are explored in Chapter 3. The next chapter explains the use of the Cantril Self-Ancoring Scale as a measure of utilities both in the experimental and the field situation.

3. PERCEPTION AND EVALUATION OF THE STRATEGIC SITUATION.

3.1. The Cantril Self-Anchoring Striving (SA) Scale as a measure of utility.

In determining the perception that actor A has of a situation there are four main variables: A's perception of the choices of action available to himself; A's perception of the choices available to B; A's evaluation of the utilities of the various outcomes to himself; and A's evaluation of the various outcomes to B.

In what follows we have attempted to control the first two variables by artifically structuring the strategic situation in such a way as to allow each actor only two possible choices, which are known to both players. In addition it is assumed in the experimental situation that the utility of the outcomes is believed by the players to be symmetrical, i.e. both players could assume that the other made approximately the sames ratings of the utilities. It thus remains to measure the values that the actors attribute to the various outcomes.

The literature on the problem of measuring utilities is extensive and technically complex, particularly where a measure up the requirement of linear transformation is required. (For a recent discussion and review see Becker & McClintock, 1967.) Here a measure is used which is adequate to provide an order of preference of the outcomes, which is sufficient for a considerable amount of subsequent analysis. Fishburn (1964) points out that ordinal information about utilities is all that is required in many situations.

The measure used here is that ladder rating, taken from the Self-Anchoring Striving Scale designed and used in some fourteen widely dispersed nations by Hadley Cantril and his associates (Cantril, 1963, 1965). As Cantril explains it:

> "... utilizing a non-verbal ladder device (- see Appendix 2), symbolic of the 'ladder of life', (the subject) is asked where he thinks he stands on the ladder today, with the top being the best life as he has defined

it, the bottom the worst life as he has defined it. He is also asked where he thinks he stood in the past and where he thinks he will stand in the fiture. He is then asked similar questions about the best and worst possible situations he can imagine for his country so his aspirations and fears on the national level can be learned." (Cantril, 1965, p.22, original emphasis.)

What is done here, in the first case in a laboratory experiment, and in the second case in a field study, is to ask in addition for the subject's ratings on the ladder scale of the various outcomes of the given strategic sitation. The differences between the outcomes on the ladder give measures of utility sufficient to establish a preference order for the alternatives and even to assess the relative differences between them.

The fact that the Cantril technique enables one to discover what the value systems of the respondents are, and thus to compare value systems across nations and socio-economic groups, is taken up at the end of the present chapter.

3.2. The SA Scale in an experimental situation.[1]

3.2.1. Procedure.

Before beginning the experiment described in the last chapter the subjects made SA scale ladder ratings for themselves and their nation (Norway). The main purpose of this procedure was to familiarise them with the scale, which was subsequnntly used to measure their utilities for the outcomes available in two of the four experimental games - those known as Cuba and Resistance. Payoffs in the other two games, Prisoner's Dilemma and Chicken, were in small sums of money, and considering the homogeneity of the sample (they were all psychology students in the same class) it was not expected that there would be any significant diferences in the

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1. The results of this experiment were reported in Lumsden, M., 'Perception and Information in Strategic Thinking', Journal of Peace Research, 1966,257-27

FIGURE 3.1. Ladder ratings for 'self' by 29 Norwegian psychology students.

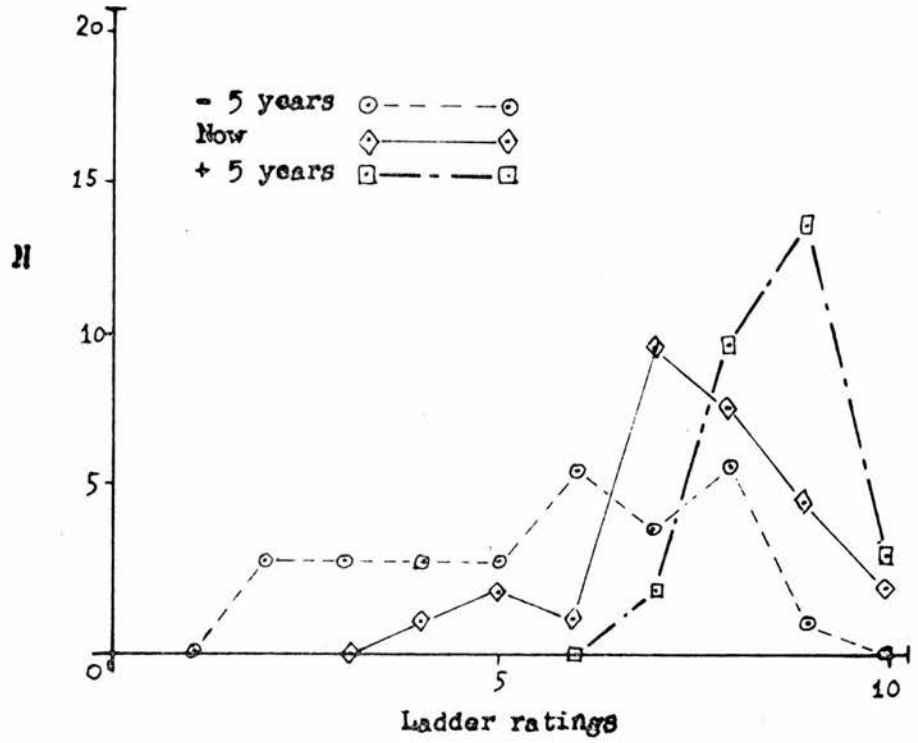
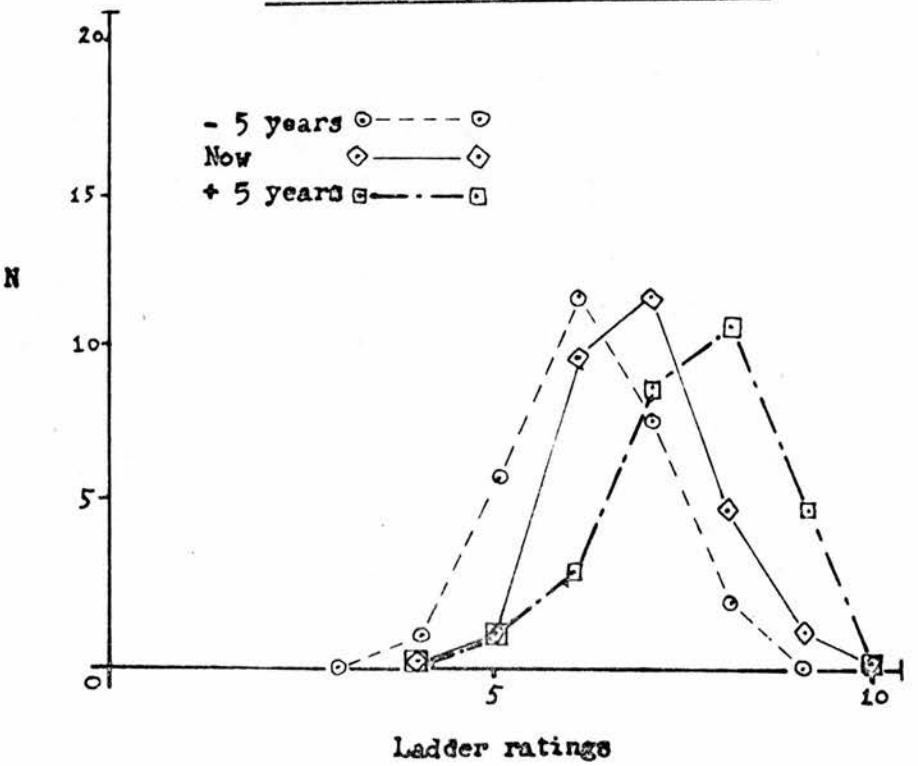


FIGURE 3.2. Ladder ratings for 'nation' by 29 Norwegian psychology students.



values of these small sums of money.

The stories attached to the Cuba and Resistance games were intended to give the strategic situation the same structure as in the Chicken and Prisner's Dilemma games respectively - the difference was that the payoffs were large, political and imaginary. There were four possible outcomes in each game (see Appendix 1), and the subjects were asked to rate each of them on a ladder scale. The values of the resulting utilities were then put in the form of a payoff matrix, giving the subjects a visual picture of the game and making clear the similarity of structure with the much simpler money-payoff games (the matrices of which were also presented to the players).

This technique gives a check on whether the Cuba and Resistance games were perceived as having the structure intended by the experimenter, namely that of Chicken and Prisoner's Dilemma.

3.2.2. Results.

Distributions on the ladder ratings for 'self' five years before, at the time of the experiment, and five years after, are shown in Figure 3.1. Equivalent results from the ratings of the nations are shown in Figure 3.2. While there are changes for the better in both cases between past and future, there is much more consensus on the ratings for the nation. In Chapter 5, these ratings are split according to the social position of the respondents. In section 3.3.3 (Table 3.2) the mean ratings are compared with those of the two samples of Greek Cypriots.

Figures 3.3 and 3.4 show the ladder ratings of each of the four outcomes in the Resistance and Cuba games respectively. Table 3.1 gives the mean ratings and compares them with the payoffs in the Prisoner's Dilemma and Chicken games.

It is clear from Table 3.1 that while the DD outcomes had the correct relative position with regard to the CD and DC outcomes to classify the games as a PD and a Chicken game, in both cases the CC outcome was clearly the most preferred, instead of being the second most preferred. Thus the two games with imaginary political payoffs were not structurally the

FIGURE 3.3. Ladder ratings of outcomes of 'Resistance' game by twenty-seven subjects.

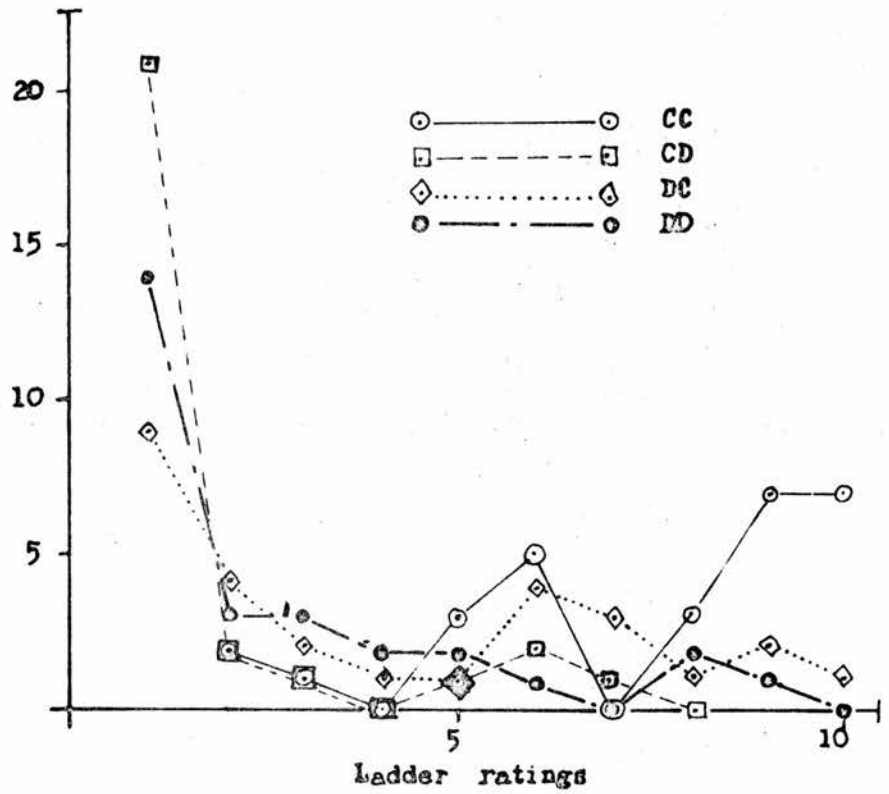


FIGURE 3.4. Ladder ratings of outcomes of 'Cuba' game by twenty-eight subjects.

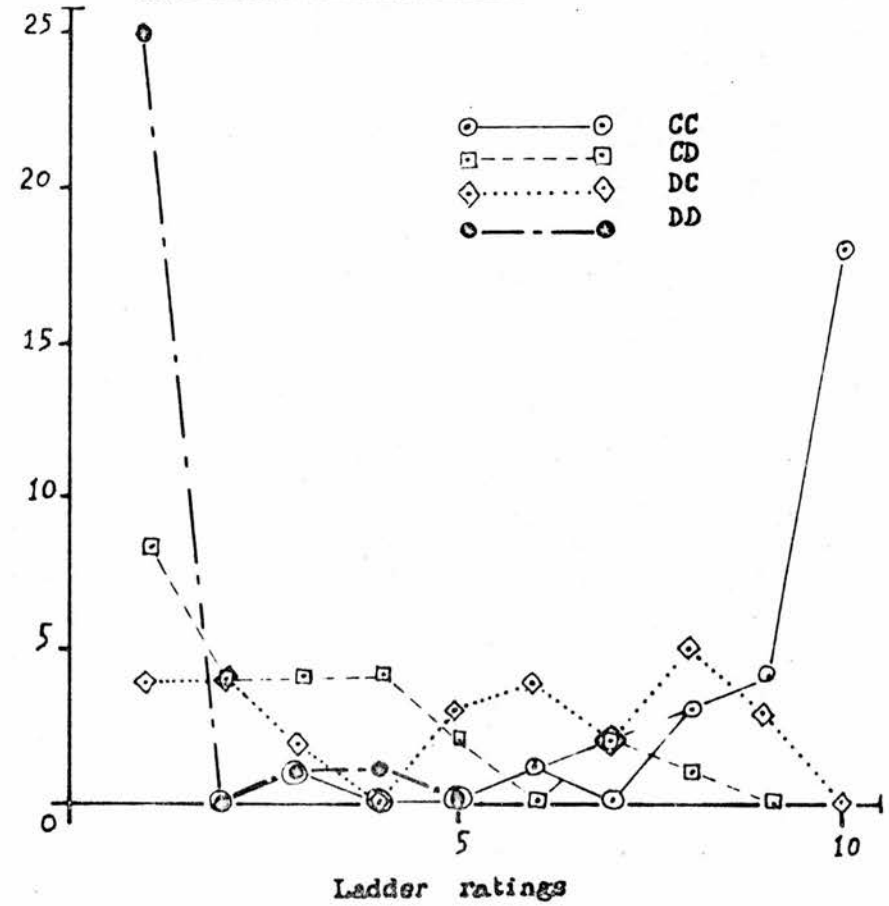


TABLE 3.1. Structure of the four experimental games.*

	CC	CD	DC	DD
1. Prisoner's Dilemma	5	-10	10	-5
2. Chicken	5	-10	10	-50
3. Resistance	7.64	1.86	4.04	5.46
4. Cuba	8.60	3.03	4.84	1.10

* Games 1 & 2 judged by real money payoffs; games 3 & 4 judged by ladder ratings, taking the mean over the 29 subjects.

games we had hoped, so that we cannot compare behaviour in games with real money versus imaginary political payoffs as hoped.

The subjects' behaviour was consistent with their evaluations - that is they made co-operative choices almost 100 percent of the time (see Figure 2.1).

3.2.3. Discussion.

We are left with the conclusion that the ladder ratings give an excellent check of whether the subjects' perceptions of the strategic situation are the same as those imagined by the experimenter. This is precisely the kind of check required in strategic situations; it is partucularly important where the opponents represent widely diverse cultures and circumstances. One of the major advangages of the Cantril technique is that it is designed for cross-cultural use.

The subjects' behaviour was consistent with the results given by the test. But we do not know if they would make the same ratings and act accordingly if they were <u>really</u> in the situations they were asked to imagine. This remains the Achilles heel of the whole attempt to apply games theory to international conflict.

The hardened games theorist may wonder at the fact that receiving a prison sentence instead of being let free; and achieving an uneasy compromise instead of a strategic victory, were given the higher ratings.

It seems too much like irrational behaviour. It is clear that higher values were operating than that of immediate personal gain. The social and political context in which strategic thinking takes place is crucial to the understanding of the actors' evaluation of the payoffs. In this case, the Cuba and Resistance games could be interpreted as games within games, where nuclear war and the occupying forces, respectively, were the opponents in a superordinate games The error of the experimenter in failing to predict the utilities of the subjects lies not so much in the basic conceptualisation, but in failing to apply it at more than one level. This is an additional complication in the experimental design, and a further argument for resisting the temptation to use real-life analogies at this stage. (For a theoretical discussion of factors 'transcending' the game see Midgaard, 1965.)

In experimental situations, the evidence (see Chapter 1) sugggests that within the limits of the experimental design, the subjects do act according to the payoff matrix, particularly when the matrix is presented to them. The variations in behaviour in the Prisoner's Dilemma are because it is a genuine dilemma, and the dilemma is approached in different ways.

We shall now attempt to make use of the ladder ratings as a measure of the utilities of the major outcomes in a real conflict situation.

3.3. The SA Scale in a field study of Cyprus.[1]

3.3.1. Introduction.

While questions of strategic analysis have been much discussed in recent years, the method rarely seems to have been applied to concrete examples in current conflicts - at least in the publicly-available literature. A number of reasons might be suggested for this: strategists have been

1. This section was discussed in outline at a seminar in the Department of Politics, University of Lancaster, 17 January 1967, and presented as a paper at the Second International Peace Research Association Conference, Tällberg, Sweden, 17-19 June 1967, under the title 'Cyprus: A Case Study in Strategic Analysis'. To be published in the Proceedings as publication no. 1-7 from the International Peace Research Institute, Oslo.

preoccupied with East-West conflicts, seen as essentially symmetrical between more or less equal power blocs; strategists have been more concerned with Great Power conflicts, rather than with TU (top-dog - under-dog) or UU (under-dog - under-dog) conflicts; and of course, professional strategists are usually in the employ of one of the interested parties to a conflict, so that their analyses are not usually published.

The apparent degree of success of 'under-dog' strategists such as Mao Tse-Tung, General Giap and 'Che' Guevara is presumeably attracting the attention of Western strategists, in an effort to devise counter-strategies. It could be a major research topic to make a formal comparison of the contrasts in strategic thinking involved: an initial look at some of the material suggests that not only differences in cognitive style (the kind of language used to describe the strategies), but also differences in cognitive mode are inportant factors (a distinction we shall return to in Chapters 5 and 6).

There are major methodological problems associated with applying game theoretic and other models to real conflicts. Any real conflict tends to be much more complex than any model (particularly any formal model), having many factors 'transcending' the game. Secondly, the problem of measuring the variables in the model has not usually been solved. In this sectionthe Cyprus conflict is chosen because it is not too complex, and for the purposes of illustration can be examined as a two-person, two-choice game. Taking the resu ts from an empirical attempt to measure the utilities that Cypriots have of the simplified matrix (Union with Greece, Partition, peace between Greeks and Turks, and war between Greeks and Turks) we then discuss, in hypothetical vein, alternative matrices.

3.3.2. The model.

For the sake of discussion here, the model taken is the simplest strategic model possible: it assumes the minimum number of actors (two), each with the mimimum number of choices (two). This results in four possible outcomes. Each of these is assumed to have a measurable value to the participants, so that they can be ordered according to a linear

preference function. The possible outcomes will be referred to as 1, 2, 3, and 4, where $1 \prec 2 \prec 3 \prec 4$, $\prec$ meaning 'is preferred less than'. Only an ordinal scale is assumed in the discussion.

The two prime actors in the system are the Greek Cypriots and the Turkish Cypriots. While Greece and Turkey, the Great Powers, the United Nations and NATO all have a role to play in the conflict, this discussion will be limited to the prime actors, since ultimately no solution is possible if they choose to go on fighting. I shall frequently use the terms Turks' and 'Greeks' therefore to refer to the Greeks and Turks of Cyprus only, not those in the mainland countries.

Each of the main actors has stated a clear but extreme position which is unacceptable to the other side While the degree of commitment to these extreme positions is unclear (see later), each side fears that the other is so committed. Becasue of the relative balance of power (the Turkish Cypriots having the threat of almost instant Turkish backing on their side because of geographical proximity to the Turkish mainland - visible from the nothern coast of Cyprus) these fears mean that any misinterpretation of the moves or motives of the opponent rapidly induces a danger of war. Any move by the Turks is seen by the Greeks as an attempt by a minority of Turkish 'terrorists' to overthrow the Government and/or set up a separate state; any move by the Greeks is interpreted by the Turks as a threat to their existence. The existential nature of the conflict is an important element. When the Turks talk of their possible annihilation by the Greeks they use historical and recent examples of actual killings and even massacres to show the danger. But I believe the danger of actual killing is grossly overstated: the real threat they feel is to their existence as a definable, self-determining community.[1] They do not want their social values, religion and culture to be trampled underfoot by the more numerous, entrepreneurial Greeks. They are particularly sensitive to this threat since the Turks were for more than three hundred years colonial masters of the Greeks, and later

1. This judgement is based on extensive personal interviews with Turkish Cypriot leaders in Cyprus, August 1965. (See Lumsden, 1965,1966a.)

enjoyed a special relationship to the British, who were happy to divide the communities in order to rule. Partition (Taksim), where the Turks unite part of the Island with Turkey if the Greeks unite with Greece, or Federation, where the Island is divided into two self-governing units with a minimum of federal links at the top, are put forward as solutions where the Turks can be their own masters at least in part of the Island.

The Greeks on the other hand, after nearly four hundred years of alien rule of varying degrees of oppressivenes (under the Turks they had the choice of giving up Christianity and becoming Moslems, having their heads cut off, or paying blood money to the Turkish emperor - a tax which continued to be extracted by the British from 1879 to 1914 and paid to the Emperor as rent for the strategic use of the Island) are determined to show that they are now in charge of their own destiny. They want to prove (to themselves as much as to anybody else) that they are neither controlled by the former colonial powers or their NATO allies, nor prevented from taking hold of the reins of government in both hands bu the Turkish minority.

Two possibilities serve these functions. One is Enosis, the union of the Island with Greece. This was the aim of the insurgency movement against the British, frustrated by the London and Zurich agreements which brought and end oo the fighting in 1959. It is still the aim of a large section of the nationalist movement, headed by General George Grivas, who apparently enjoys the backing of successive Greek Governments.

The other possibility is an independent, unified nation with a Greek majority government, and certain personal, religious and cultural rights for the Turks. This perhaps has a greater appeal for the politicians in power since it enables them to continue to play a role on the world stage, as well as remaining politically in advance of the regime in Athens. (It is even more doubtful that Makarios would like to merge his religious role in the Greek religious hierarchy, since within the Orthodox Church, the Cyprus Church enjoys 'autocephalous' status, second only to Istanbul (Constantinople).) (A fuller account of the background of the conflict may be found in Lumsden, 1966b.)

Thus both sides have an extreme choice (Enosis for the Greeks, Taksim for the Turks) which is quite unacceptable to the other side, and some less defined alternatives. If there is a peaceful solution it probably lies amongst these alternatives; as yet it has either not been discovered, or remains unacceptable to one party or the other. The real situation will be discussed again later, but for the initial discussion it will be assumed that each side is faced with essentially two choices: the extreme political choices of Union with Greece (the Greeks) and Partition (the Turks); or something less than these ideals, but which represents a possibility of peace between the two communities. Peace depends on the co-operation of the two communities, and can be prevented by one of the communities if it insists on its particular 'hard line'. Thus, if the Turks give up the idea of Partition or Federation for the sake of peace, the Greeks might more easily achieve Enosis. If the Greeks give up Enosis, and the Greek forces go home, the Turks might find it easier to split the Island in two (as to some extent they already have attempted by moving some of their own population into Turkish-controlled areas).

For the sake of discussion, therefore, we shall allow each side two choices only - co-operation and competition (or integration and conflict). We shall suggest four possible outcomes as in the matrix below:

MATRIX 3.1. The Cyprus conflict as a 2 x 2 non-constant-sum game.

		Choices open to Turks.	
		B_1 Cooperation	B_2 Conflict
Choices open to Greeks.	A_1 Cooperation	Peace	Taksim
	A_2 Conflict	Enosis	War

Each of these outcomes may be regarded as having a certain utility, which may be positive or negative, and may be different for each player. Thus peace might seem to most valuable alternative to outsiders, but it may not be to the Cypriots, or at least to the leaders who make the policy decisions. Thus the Greeks believe that the Turkish leaderhip has a higher

value for Partition than for peace, while the Turks believe that the Greeks have a higher value for Union with Greece than for peace with the Turks. Hence each, following the logic of the Prisoner's Dilemma, chooses conflict rather than co-operation, believing that the other will choose the competitive policy. This prevents the opponent attaining his objective (if necessary by fighting an 'honourable and glorious' battle), and if the other does after all back down, ghe competitor will (he thinks) attain his objective. The arguments are thus circular, deadlocked by suspicion and lack of trust.

Thus the question may be put: Is the Cyprus conflict, as viewed by the participants, a Prisoner's Dilemma, where peace is prevented by lack of trust and communication? Is it a Chicken game - which is structurally similar, except that, unlike a Prisoner's Dilemma, Partitiom would be valued as a better alternative than war by the Greeks, and Enosis better than war by the Turks? Or is it some other kind of non-constant sum game?

3.3.3. The data.

The possibility of studying a real, on-going conflict is one which is both exciting and frightening - exciting because of the feeling that the key to the understanding of conflict behaviour may lie at the scene of the conflict; frightening because of the insurmountable-looking practical and methodological difficulties - and because there is some danger involved.

Though the conflict in Cyprus is seen essentially as a two-party conflict (greatly complicated because of intervention by various other Powers) a third party, the United Nations Force in Cyprus (UNFICYP) has been injected, though on somewhat different terms. The aim of this third party is to stop fighting between the other two, and, hopefully, to induce some co-operative behaviour between them.

The purpose of the present study was to gather hypotheses for further work; to gain first-hand experience of the problems of two-party conflict and third party intervention; to assess the feasibility of field research of conflict; and to try out two measuring instruments of relevant variables.

- the perception that each side has of the others (see Chapter 4), and the subjective utilities of the various possible outcomes. While communication between the parties is a very important variable it is very difficult to measure. However, an attempt was made to compare samples in Nicosia, where there is a rigid division of the Greek and Turkish communities, but much contact with the UN force, and Limassol, where there is no such rigid separation, but little UN presence.

It was not possible for the author single-handed in a short time to attempt a sophisticated sampling procedure. He therefore arranged to take samples which may be described as likely to be 'fairly representative' of the population as a whole, but which were comparable amongst themselves: these were four classes of senior secondary school pupils, aged 17 years, selected from the middle range of ability. There were two Turkish and two Greek Cypriots classes, one each in Nicosia and Limassol. The school system is such that the schools contain pupils from all levels of the society, from both town and the surrounding villages. On the other hand, because of the troubled circumstances, the Turkish schools had experienced more disruption and not all the pupils has been able to return to the schools from the areas where the Turks were isolated. The classes had some girls as well as boys.

It is a matter for debate (or better, empirical investigation) how representative 17-year old high school students are of the general population. However, in Cyprus, there is little sign of a "teenage cult" separating young from old as it sometimes seems to do in Western Europe and North America. Further, as has been argued elsewhere (Lumsden, 1996a), the young people have, at least on occasion, been directly involved in the conflict. At the time when the present troubles started in Cyprus a high number of educated but unemployed young people (a serious problem in many other countries at a similar level of development; see the U.N. Report on the World Social Situation, 1963). 38 percent of the male population in 1960 was under 15 years (U.N. Demographic Yearbook, 1963); about 70 percent of the relevant age-groups were receiving secondary education (Greek Education in Cyprus, Education Office, Nicosia). Only about one-half the people leaving the secondary schools were able to find employment in Cyprus, and the 1962 Immigration Act in the United Kingdom reduced drastically the number who were able to emigrate (previously 12-13,000

per annum, out of a population of some 600,000), thus worsening the job situation in Cyprus. It is reasonable to expect a considerable amount of frustration amongst young people as a result of this situation, which may have been a factor in the uneasy period · · precipitating the communal hostilities. (Now most of the younger age-groups are conscripted into their respective forces.)

Thus, though the samples were extremely limited, we are arguing that they may have some intrinsic value; and also that they may not be so unrepresentative of the general opinions held in the country.

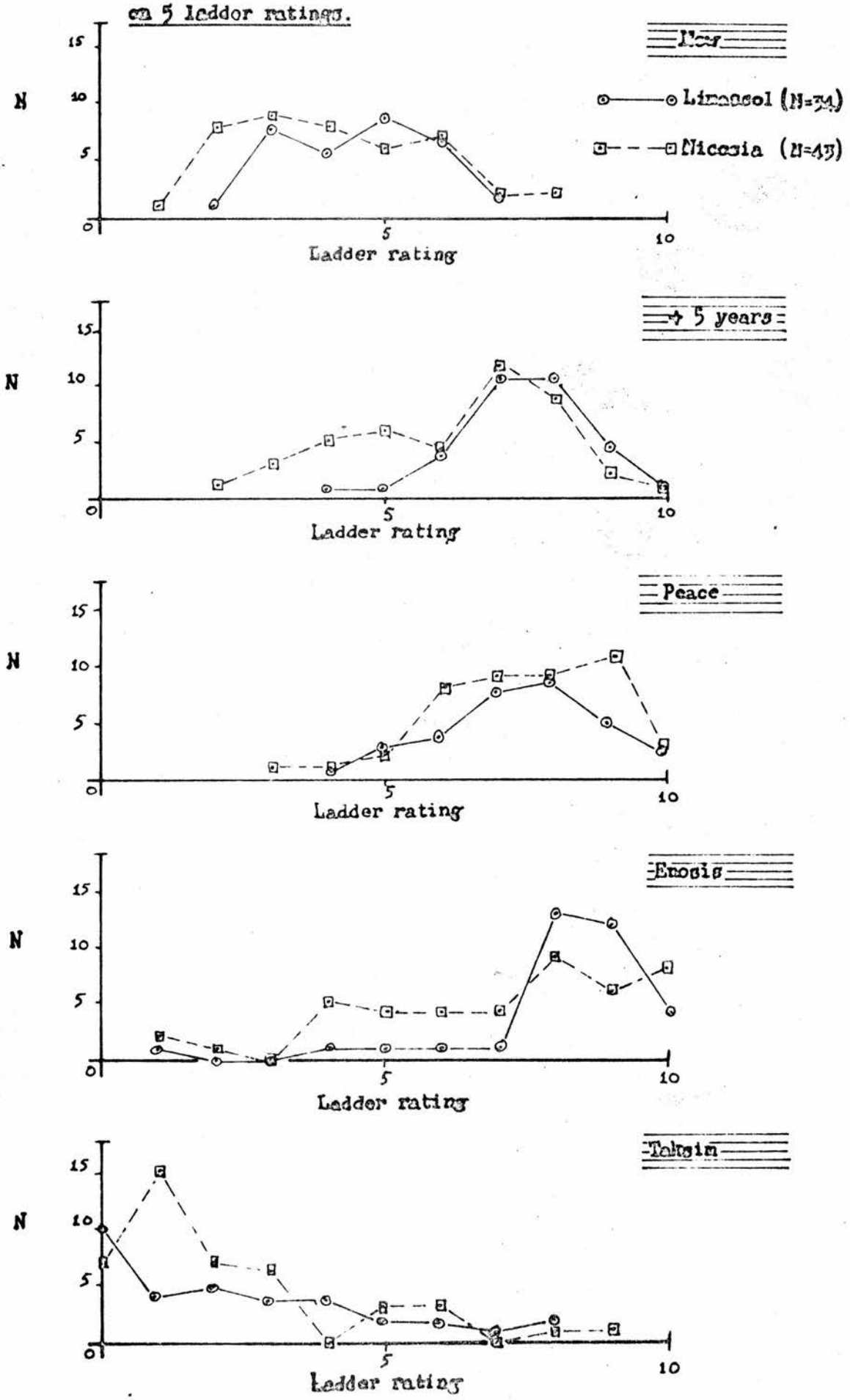
Permission was obtained from the Cyprus education authorities to administer the tests - the ladder ratings of the Cantril Self Anchoring Striving Scale, and a set of Semantic Differentials. The ladder ratings were used to give the utilities of the outcomes of the conflict required to construct a payoff matrix.

Permission was also obtained from the Turkish Cypriot authorities, but regrettably the tests were never carried out. Data is therefore only available for the Greeks, However, even this is of great interest, since, as far as the author is aware, this is the only attempt to measure the utilities of the participants in an ongoing conflict by direct means in the field (though less formalised studies have been made in race conflicts).

A 10-rung ladder was drawn on the blackboard and the subjects were asked to imagine that the top represented the best possible life situation for them they could imagine, and the ground level (0) represented the worst to which they could sink. They were were then asked which step they thought they were on then, where they expected to be in five years' time, and where the expected to be in five years' time in the event of Enosis, Taksim and peace between Greek and Turkish Cypriots. By taking the difference between the position now and each of the possible futures, we get a measure of the expectations of change, i.e. the net expected gains or losses, which is a measure of utility.

The distributions from the two equivalent samples of 17-year old Greek Cypriot high school students, one sample from Nicosia, the capital

FIGURE 3.5. Distributions of Limassol and Nicosia samples on 5 ladder ratings.



of the Republic, the other from Limassol, one of the main provincial towns, are presented in Figure 3.5. The mean ratings are shown in Table 3.2. For comparison the data from the Norwegian student sample are added where appropriate. It will be noted that whereas the Norwegians have very low expectations of change, the Cypriots have very high expectations - second only to the Dominican Republic in Cantril's (1965) sample of fourteen nations.

TABLE 3.2. Ladder ratings: Two samples of Greek Cypriot high school students compared with Norwegian psychology students.

	Cyprus		Norway
	Limassol (N = 34)	Nicosia (N = 43)	Oslo (N = 29)
1. Self:			
Now	4.44	4.13	7.55
+ 5 years	7.41	6.23	8.13
- 5 years	--	--	5.84
Expectation of change	2.97	2.10	0.58
2. Nation:			
Now	--	--	6.83
+ 5 years	--	--	7.65
- 5 years	--	--	6.14
Expectation of change	--	--	0.82
3. Cyprus after 5 years:			
Peace (CC)	7.41	7.37	--
Taksim (CD)	2.55	2.25	--
Enosis (DC)	7.97	6.83	--
War (DD)	--	--	--
4. Cuba game:			
(CC)	--	--	8.60
(CD)	--	--	3.03
(DC)	--	--	4.84
(DD)	--	--	1.10

(Table 3.2 contd.)

5. Resistance game:			
	(CC)	--	--	7.46
	(CD)	--	--	1.86
	(DC)	--	--	4.84
	(DD)	--	--	1.10

The Cypriot students were not asked to rate 'war between Greek and Turkish Cypriots' because I had ethical doubts, and more doubts about the validity. However, the Norwegian students showed no difficulty in making ratings of the equally serious, though imaginary, outcomes of the Cuba and Resistance games, so perhaps I could have been bold enough to ask for the ratings of war in Cyprus. This would have given all the values for the payoff matrix we shall discuss. As it is we only have three of the values and for only one of the sides. Even this may form the basis of an anlysis. First, however, we shall point to some important differences between the two samples from which we have data (Table 3.3).

TABLE 3.3. Ladder ratings: Scores expressed as expectations of change for two groupssof Greek Cypriots.*

Condition 5 years from now	Limassol (N = 34) Expectation of change	Rank	Nicosia (N = 43) Expectation of change	Rank
1. No condition specified	2.87	3	2.10	3
2. Peace between Greeks and Turkish Cypriots	2.92	2	3.27	1
3. Taksim (Partition)	-2.02	4	-1.89	4
4. Enosis (Union with Greece)	3.52	1	2.88	2

* Spearman Rank-difference Correlation Coefficient, 0.80.

We see from Table 3.3 that while Enosis is the most highly rated alternative in Limassol, peace is the more highly rated in Nicosia. These results are put in the form of a payoff matrix for each group in Matrices 3.2 and 3.3.

MATRIX 3.2. Limassol Greeks.*

Peace	Taksim
2.92 (2)	-2.02 (1)
Enosis	**War**
3.52 (3)	--- (?)

MATRIX 3.3. Nicosia Greeks.*

Peace	Taksim
3.27 (3)	-1.89 (1)
Enosis	**War**
2.88 (2)	--- (?)

* The figures in brackets represent the preference orders of the three outcomes for which we have data, where $1 < 2 < 3$.

The difference in the rating for peace is not only in the absolute rating but in the order of preference. This especially interesting since the school which the Nicosia students were attending was in the old walled city, where much of the fighting has taken place, and where the separation of the two communities is the most extreme. On the other hand the school has a long tradition of Greek nationalism, dating back to the last century. Since this is an important finding, Table 3.4. breaks the figures down further to show how many in each group actually did rate peace higher than Enosis, and vice versa.

TABLE 3.4. Ratings of peace compared with Enosis by number of respondents in each group.*

	Peace > Enosis	Peace = Enosis	Enosis > Peace	N
1. Limassol	4	10	20	34
2. Nicosia	16	4	23	43
TOTAL	20	14	43	77

* Chi-square = 9.13. (For $p < .01$, chi-square > 9.21.)

Table 3.4 shows that although a majority in each preferred Enosis, a considerable proportion in Nicosia rated peace higher (only 4 rated it the same as Enosis), whereas in Limassol only 4 rated peace as higher (though 10 rated it the same as Enosis). (Chi-square 9.13 enables us to reject the null hypothesis that this difference is due to chance at beyond the .02 level of probability.) However, it is clear that the higher mean rating for peace in Nicosia is due to higher relative ratings by a minority.

Whatever the validity of these figures as repesenting the general population, they do reflect serious political differences in the Greek community. On the one hand are the followers of Grivas, to whom Enosis is a mystical, relgious-like end ('Union with Mother Greece'), and the way to achieve it is "We must have faith!" (the words of Grivas himself in the author's presence to a one-time political advisor). General George Grivas left the Island asfer leading the insurgency against the British and lived in retirement in Athens until June 1964, some six months after the outbreak of hostilities, when he returned secretly and again took an important role. Subsequently he assumed control of the (conscripted) Cyprus National Guard, and some 10-15,000 troops from Greece, which puts him in a powerful position. He is a fanatical anti-communist; as a resistance leader in Greece in World War II he was regarded (so I am informed by an ex-member of British intelligence, now a professor of politics) as collaborating with the Germans against the communist resistance. He has had for many years considerable personal and political differences with President Makarios. (This is fairly well-known, but I have personal confirmation from a long-time associate of the two.) My impression in 1965 was that Grivas was slowly losing politically in Cyprus, but that he retained the support of the Greek Government.

Enosis represents about 100 years of often bitter struggle, and it is emotionally difficult to give it up. Nevertheless, there are those with strong political objections to the regime in Greece, to its NATO membership, and those who would lose economically by the loss of Commonwealth trade preferences, etc., who are prepared to consider other formulae for a solution to the conflict, such as 'self-determination', without Union with Greece. This could give the Greeks the feeling that 'We could always have Enosis when we want it, but just now there are many problems to overcome . . . " Greek Cypriot politicians cannot yet come

out against Enosis. But this is precisely what makes the Turks feel that whatever guarentees they have the will be faced with Enosis sooner or later. While the considerable left-wing of the Greek community seems prepared to live alongside the Turks, the Turks do not seem to want to live alongside a left-wing; they seem literally to have killed most of the Turkish left-wing opposition leaders. Both Grivas anf the Turkish leadership reject Makarios because he has found it politic to have dealings with the Greek Cypriot left.

Our results indicate this split in the Greek community. The outcome to which most can agree is Enosis - but it is this which brings them in conflict with the Turkish community, and thus with Turkey, presenting them with the threat of war. (This threat is justifiably taken seriously. Most of the military activity is related to a potential Turkish invasion. There is a large civil defence organisation, and schools and public buildings are protected with sand-bags, backing paper on glass to prevent shattering, etc.)

3.3.4. The preference orders of Greek and Turkish Cypriots.

(i) The Greeks. We have already noted differences in the preference orders of quite a number of our sample of Greek Cypriots. Since we do not know their evaluations of cell 4 - war - we can reasonably suggest that war may either be rated as the worst of all outcomes, or that it may be rated better than Partition. To some Greeks war may seem a way of solving the problem one way or other, once and for all time, which, because of their numbers, might be more satisfactory to the Greeks. Such reasoning has the appeal of simplicity, ending of uncertainty, etc., but involves a great deal of optimism to play down the potential role of the Turkish mainland forces in the event of open war. Matrices 4 to 7 show the possible preference orders of the Greek Cypriots since it is unlikely that war will be rated higher than Enosis or peace.

We may examine these matrices from the point of view of games of strategy, leaving out the Turkish preferences for the moment for the sake of clarity. It will be noted first that, for the Greeks alone, Matrix 6 has the characteristics of a Chicken game, where A_2 may result in either the best or the worst payoff, whereas Matrix 7 is a Prisoner's Dilemma,

MATRIX 4			MATRIX 5			MATRIX 6			MATRIX 7		
	B_1	B_2		B_1	B_2		B_1	B_2		B_1	B_2
A_1	4	2	A_1	4	1	A_1	3	2	A_1	3	1
A_2	3	1	A_2	3	2	A_2	4	1	A_2	4	2

where A_2 may result in the west payoff but not in the worst. Matrices 5 and 4 turn out to be structurally equivalent to 6 and 7 respectively. In 4, A_1 is a dominating strategy, in 7, A_2 dominates.

(ii) <u>The Turks.</u> As explained there is no data available on the Turkish preference structure. This in itself may be significant. It may be that the Turks feel much more that the conflict is one of life or death for them, and as such the options cannot be rated on a simple scale: the choice is 'to be' or 'not to be'. It may also be that the political leaders, through whom the test had to pass, did not feel that the test was in their interest, since they have adopted the position that peace is impossible between the two communities, so that Partition (or Federation) is the only solution. They seem, in other words to be dominated by their strategy B_2. This time we shall argue backwards to the preference structure

If war is preferred to either Enosis or peace, for reasons of honour, pride, faith or fatalism, then the possible matrices are as follows (8,9):

MATRIX 8			MATRIX 9		
	B_1	B_2		B_1	B_2
A_1	2	4	A_1	1	4
A_2	1	3	A_2	2	3

If Enosis and peace are preferred to war, the matrices are as shown in 10 to 13:

MATRIX 10			MATRIX 11			MATRIX 12			MATRIX 13		
	B_1	B_2		B_1	B_2		B_1	B_2		B_1	B_2
A_1	2	4	A_1	3	4	A_1	1	4	A_1	3	4
A_2	3	1	A_2	2	1	A_2	3	2	A_2	1	2

In each of these matrices we are combining Federation and Partition (Taksim) under one heading (B_2) - they both involve separation of the two communities. We are also assuming that Enosis and 'peace', dominated by a majority of Greeks, are not perceived as so very different from each other, so that both will either better or worse than war. We could of course imagine other matrices where, for example, Enosis was seen as the worst outcome and a compromise solution as the best. Alternatively, there might be some Turks who could imagine a Greek government that would allow the Cyprus Turks andbetter position that they would have in an independant Cyprus under a Greek Cypriot majority rule. However, since it was in an independent state that the present conflict arose, and there being no sign of Enosis appearing a better alternative for the Turks, we shall continue the analysis on the basis on the assumptions we have made and with the matrices above.

3.3.5. The Cyprus 'game'.

Given that each player in a 2 x 2 game has a preference order for each of the four possible outcomes, there are 576 different games. Of these 78 are non-equivalent. This complexity, resulting from the simplest of strategic situations, is a major reason for simplifying the structure to that of a 2 x 2 game. What we have done here is to eliminate as many as possible of those which seem unlikely in the real situation. We are left with twenty-four games.

In a paper of Anatol Rapoport and Melvin Guyer (1966), to which the following analysis is much indebted, a taxonomy of the 78 possible non-equivalent games is created. We shall now apply this taxonomy to our remaining 24 games.

The first criterion for the classification is that of dominance. One strategy is said to dominate another if and only if in using it a player does no worse, and in general, better, regardless of the strategy chosen by the other player. This gives three classes of game - Class I where both players have a dominating strategy; Class II where one player has a dominating strategy; and Class III where neither player has a dominating strategy.

Savage (1954) refers to the dominating principle as the 'sure-thing' principle. Ellsberg (1961) reviews a number of shortcomings and cites many examples that he and others find 'unreasonable' (Becker & McClintock, 1967). Luce and Suppes (1965) point out that the dominance or 'sure-thing' principle leads to the Prisoner's Dilemma and is inconsistent with the Pareto optimal criterion for social conflicts (see below). Guyer and Rapoport's taxonomy puts these principles into clear relationship with each other, and in doing so seems to resolve much of the difficulty. They are however not so much concerned to use the terms prescriptively but descriptively.

The next concept, also taken from formal games theory, is that of an equilibrium outcome, which is one from which neither player can depart (i.e. change to the other strategy), while the other player keeps to the same choice, without diminishing his own payoff. All the games in Classes I and II have exactly one equilibrium outcome, where equilibrium by pure strategies (not to mixtures of strategies to a certain optimum over time, which may give another kind of equilibrium), but games in Class III have either two equilibria or none.

Finally there are various kinds of equilibria, depending on the degree and nature of stability. Briefly this results in the following categories of game.

Category 1. No-conflict games are those where these is an absolutely stable equilibrium, the maximum payoff to both players being in the same cell of the matrix. None of the twenty-four matrices we obtain by combining those we derived for the Greek and Turkish Cypriots falls in this category.

Category 2. Games with a single, strongly-stable Pareto-equilibrium. A Pareto equilibrium is one with the property that there is no other outcome in the game in which neither player gets a smaller payoff. Combining Matrix 7 (the Greek payoffs) with 8 and 9 (Turkish) we get two such games (Matrices 14 and 15).

MATRIX 14

	B_1	B_2
A_1	3, 2	1,4
A_2	4, 1	2,3*

MATRIX 15

	B_1	B_2
A_1	3,1	1,4
A_2	4,2	2,3*

The first entry in cell refers to player A (the Greeks), the second to plaeer B (the Turks). '*' indicates the equilibrium outcome.

In both cases of a strongly-stable equilibrium outcome, this outcome is war.

Category 3. Games with a strongly stable deficient equilibrium are those where the equilibrium is not Pareto-optimal. Combining Matrices 7 and 13 we get one such game (Matrix 16). Indeed there is only one one such game in the theoretical total of 78: it is the Prisoner's Dilemma. In the present case it is where Enosis is most preferred by the Greeks and least preferred by the Turks, and Taksim is most preferred by the Turks but least preferred by the Greeks. A Pareto-optimal outcome in this context is such that there is no other outcome in which both players get a more preferred payoff. The irony of the Prisoner's Dilemma is that there is an outcome in which both players get a larger payoff, but it is not the equilibrium outcome. The Pareto-optimal outcome is peace, the equilibrium outcome is war.

MATRIX 16

	B_1	B_2
A_1	3,3	1,4
A_2	4,1	2,2*

Category 4. Games with a single stable equilibrium are those where neither player "has the inclination to or else is unable to either force or induce the other to shift". Here we find two such games, where both players have a dominating strategy (Matrices 17 and 18), and two in Class II, where only one player has a dominating strategy. (Matrices 19 and 20).

MATRIX 17			MATRIX 18		MATRIX 19		MATRIX 20	
	B_1	B_2	B_1	B_2	B_1	B_2	B_1	B_2
A_1	4,2	2,4*	4,1	3,4*	3,2	2,4*	3,1	2,4*
A_2	3,1	1,3	2,2	1,3	4,1	1,3	4,2	1,3

In each of these four casesit is Taksim which is the equilibrium, which means that if war is the worst preference for the Greeks, while Taksim and war are the highest preferences for the Turks, then the Greeks cannot get the Turks to depart from the extreme strategy B_2, even when A_1, the moderate strategy, is their own dominating strategy.

Category 5. Games with a single threat-vulnerable equilibrium. Here a distinction is made between inducing and forcing a shift in the other's strategy. As Rapoport and Guyer use the terms, 'one induces the other player to shift strategy if the other player sees that it is to his advantage to shift rather to suffer the consequences of the other's shifting. One forces the other player to shift strategy if, as a consequence of one's own shift, it becomes advantageous for the other to shift also' (original emphasis). Equilibrium outcomes in which one of the players is in a position to induce but not to force a change of strategy are called threat-vulnerable equilibria. However, the threats are only good if they are not carried out. Games where one of the players is able both to force and to induce a change of strategy by the other player are called unstable equilibria. Games where one of the players is able to force but not to induce a change by the other player are known as force-vulnerable equilibria. Here we find a single threat-vulnerable game in Class I (Matrix 21), but four in Class II (Matrices 22 to 25).

MATRIX 21

	B_1	B_2
A_1	4,3	2,4
A_2	3,1	1,2

MATRIX 22			MATRIX 23		MATRIX 24		MATRIX 25	
A_1	3,2	1,4	3,3	1,4	3,1	1,4	3,3	2,4
A_2	4,3	2,1	4,2	2,1	4,3	2,2	4,1	1,2

In Matrix 21, where both have a dominating strategy, the Greeks may be able to induce the Turks to accept peace by threatening Enosis. In Matrices 22 to 25, the Greeks may be able to induce the Turks to accept Enosis by threatening war.

Category 6. Games with a single force-vulnerable equilibrium are only found in Class II, and we find four (Matrices 26 to 29).

MATRIX 26			MATRIX 27		MATRIX 28		MATRIX 29	
	B_1	B_2	B_1	B_2	B_1	B_2	B_1	B_2
A_1	4,3	1,4	4,2	1,4	4,1	1,4	4,1	2,4
A_2	3,1	2,2	3,1	2,3	3,2	2,3	3,3	1,2

All games of this category have the characteristic that by changing his strategy one of the players can force the other to change. However, this initiates a cycle. In Matrix 26, for example, A_1B_1 is a Pareto-optimal outcome, but it is not an equilibrium, so that, Rapoport and Guyer point out, it somewhat resembles the Prisoner's Dilemma. The difference is that only one and not both the players is motivated to defect from it. In this case it means that while peace is a Pareto-optimal solution, the Turks are motivated to push for Partition, since they still prefer war to Enosis if the Greeks should also change their strategy. In Matrices 27 and 28 the 'natural outcome' (the one which results where one player has a dominant strategy and the other chooses assuming he will play this strategy) is war. The Turks are not motivated

to move from this strategy since they are better off than under either of the alternatives if they change their strategy. On the other hand, if they do change, this may encourage the Greeks to go for peace, their maximum utility in these three games, which might then enable the Turks to change again and achieve Taksim instead of the natural outcome, war. In Matrix 29, A_1 is dominating for the Greeks, though A_2B_1 is Pareto-optimal. (Since this outcome is Enosis, this is an unrealistic situation in practice.)

Category 7. Games with a single unstable equilibrium are all in Class II, and we find two (Matrices 30 and 31)

MATRIX 30

	B_1	B_2
A_1	4,2	2,4
A_2	3,3	1,1

MATRIX 31

	B_1	B_2
A_1	4,3	2,4
A_2	3,2	1,1

In these two games both threat and force are available to one player - the Greeks (row player). A_1 is dominant for them, so that on the assumption that they choose it, the Turks might choose B_2, which makes A_1B_2 the natural outcome. However, since the Greeks want to avoid this (Taksim) they can threaten, or actually choose, A_2. Either way the Turks would then do better to choose B_1 and avoid war. Matrix 30, where the Turks prefer Enosis to peace seems unlikely, though not impossible - the Greek Government might be regarded as more restrained, and/or politically acceptable than the Cyprus Government. In any case these are cycle games and do not give hope of a stable solution.

Category 8. Games with two Pareto-equilibria, one of them being the natural outcome. We now move to Class III, where neither player has a dominating strategy. There is only one game here in this category (Matrix 32).

MATRIX 32

	B_1	B_2
A_1	3,1	2,4
A_2	4,3	1,2

In this game A_1B_2 is the natural outcome and is Pareto-optimal in that there is no other outcome where both players are better off. On the other hand, there is an outcome where A can be better off and where B will also do well, which is also Pareto-optimal - namely A_2B_1. A cannot threaten because B will not voluntarily shift to A_1B_1; he can only force him to change by choosing A_2. However, once he has done so, B may carry out the came strategy. Thus the Greeks might force Enosis by a fait accompli, which the Turks might accept to the extent of avoiding war. But then they might try to partition the Island, uniting part of it with Turkey, which the Greeks in turn would have to accept to avoid war.

Category 9. Pre-emption games are those games with two Pareto-equilibria, neither of which is the natural outcome. We find two (Matrices 33 and 34).

MATRIX 33

	B_1	B_2
A_1	3,3	2,4
A_2	4,2	1,1

MATRIX 34

	B_1	B_2
A_1	3,2	2,4
A_2	4,3	1,1

Matrix 33 is another of the 'infamous' games, much discussed in the literature: it is the game of Chicken. Each player has an interest in defecting from the outcome A_1B_1 before the other player. (Actually the way the paradigm of the game is played, by youths driving cars at each other along the centre of a highway, is the idea is to force the other player to choose 1 by threatening A_2B_2, the worst outcome for both.) In this game one player may try to pre-empt the other by choosing 2 in the hope that the other may be deterred from choosing 2 by the threat of A_2B_2: if both choose the second strategy, the result may be disastrous. Whatever the exact nature of the events in Cyprus at the of 1963, some Greeks at least explain them as an attempt at pre-emption on the part of the Turkish Cypriots. Turks on the other hand feel that the Greeks had been trying to carry out a 'step-wise' pre-emption, gradually achieving their ends by successive legislation and other measures, and that the Turkish pre-emption was to 'pre-empt a pre-emption': a game of Chicken, in fact.

Category 10. Cycle games are the final category, those where there are no equilibria (Matrices 35-37).

MATRIX 35		
	B_1	B_2
A_1	4,3	1,4
A_2	3,2	2,1

MATRIX 36		
	B_1	B_2
A_1	4,1	1,4
A_2	3,3	2,2

MATRIX 37		
	B_1	B_2
A_1	4,2	1,4
A_2	3,3	2,1

While these games have no equilibria in the technical sense, in each case the cycle can be stopped if player B is satisfied with preference 3. In Matrix 35 this would mean the Turks accepting peace, as the most favoured outcome tor the Greeks; in Matrices 36 and 37 it means the Turks accepting Enpsis, even though it is paradoxically not the most favoured alternative for the Greeks.

3.3.5. Discussion.

It may seem that the apparently simple, static model with which we started has led to a confusing richness. If all the data had been available from both Greeks and Turks we could have constructed a single matrix and said, This is the game being played in Cyprus. (Of course we have said nothing of the interests of other parties, the importance of which has recently been enphasised.) But is we had been able to construct a single matrix we should probably not have asked a number of the important questions which arise. Thus, we have analysed twenty-four possible games, indicating that many of them are compatible with the real situation. This is not inconsistent. Not all members of a population can be expected to share exactly the same value system, to order their preferences in the same way, or to perceive the nature of the conliict in the same way. The complexity of the conflict, and a major reason for its apparent insolubility may lie in just such a reason. It is rather like the kind of chess match which is played on several boards at once, one on top of the other. If one makes a cross-sectional analysis, at one level, the result may be false because it fails to take into account the other games being played. Again, one can imagine the difficulty of analysing a situation where the players were each playing games with different rules. This kind of richness in the model

would have been lost if we had had enough data to fill up a single matrix, which might have been possible with representative sampling, and co-operation from both parties.

The validity may be questioned on a number of grounds. The limitation to two choices is too simple, but this seems to be largely how the participants in almost any conflict cognitively structure the situation. At any one moment there may be many tactical choices open, but in terms of long-tange strategy it is question of achieving a particular end or something less than that end. A similar argument applies to the limitation to four outcomes, which may not even seem to us to be mutually exclusive. For example Cyprus could be partitioned, part of it being united to Turkey and part to Greece. The Turks accept this aa a possibility, but not the Greeks. (Nor on practical did the United Nations Mediator in his Report to the Secretary General (S/6253, 25 March 1965). It is difficult to see the creation of a new, artificial and higly sensitive border between Greece and Turkey as a solution to the problem.) When one is in Cyprus it is much easier to understand why these are seen as exclusive categories. Physically separating two interwoven communities has enormous practical difficulties. Dividing the administration of five or six towns, several hundred villages and a population of some 6-700,000 between rival capitals each far from the Island and far from each other would probably lead to chaos. In addition, the Greeks after hundreds of years of alien rule want to rule in their own land without feeling they are being forced into 'selling out' to their erstwhile colonial masters. The Greeks in Cyprus are interested in sovereignty and self-identity, and Partition or Federation are unacceptable wounds to that sovereignty. (But so are the Turks interested in <u>their</u> sovereignty - hence the conflict.) The model, in other words, portrays the conflict with some richness and faithfulness (though it does not bring in the crucial interests of Greece, Turkey, the Great Powers, NATO and the United Nations).

The validity of the Cantril scale may be questioned, since the numbers may well means different things to different people (as Cantril himself points out). But this is the point of taking the <u>relative</u> differences in the expectations of change from the situation now, and constructing an <u>ordinal</u> set of preferences.

One may also question the usefulness of samples of high-school students. The investigation was designed as a pilot study, with the intention of comparing equivalent samples of Greeks and Turks from the capital and a provincial town. As mentioned earlier the Turkish results did not materialise, but the Greek results were comparable for age, sex and educational level. No attempt was made to draw a sample from the general population since it was intended to compare two samples rather than to generalise to the population as a whole. (In particular , the intention was to compare the perceptions of the UN force, to which the two samples had differential exposure. (See Chapter 4.)) The foregoing results suggest that the method is worthy of further study and application.

Perhaps I could conclude this section with a remark of Cantril himself: "I do feel ... (that) the studies were the best that could be done at the time and under the circumstances, and I hope academic purists will bear this in mind. I have tried throughout ... to be cautious and conservative in interpretations." (Cantril, 1965, p.28, original emphasis.)

3.3.6. Some policy implications.

Of the twenty-four matrices obtained from the seventy-eight possible none were no-conflict games. In all those games where there was a strongly stable equilibrium or a strongly stable deficient equilibrium (the Prisoner's Dilemma), the equilibrium outcome was war. In each of the four cases with a single stable equilibrium, the outcome was Taksim: these were the games where war was the worst possibility to the Greeks and second best to Taksim for the Turks. (Thus in these games the Turks were the 'baddies', and the Greeks the 'goodies'.)

In all the other cases the structure of the games leads to dynamic factors which prevent stable equilibria - threat, force, pre-emption, cycling etc. In several of these games however the cycle could be stopped if one of the players was prepared to accept his second best outcome. In one game this would mean the Turks accepting peace, the most favoured alternative of the Greeks; in two games it would mean the Turks accepting Enosis, even though this was not the most preferred outcome for the Greeks.

Which of these games is the most dominant it is obviously not possible to judge from the available data. Probably most readers will like, as the writer, pick on several games which seem likely. One suggestion would be to have a UN-sponsored team of social scientists to draw up proper samples, carry out the tests, calculate the matrices, and pronounce upon the nature of the resulting game. This would at least make clear the exact nature of the problem (except that as mentioned earlier it is likely that several games are going on at the same time).

In this way the role of third parties could also be made clearer. For instance, the United Nations Force in Cyprus essentially has the job of ruling out one of the outcomes, war. What is the efffect on the game if this is the only stable outcome? Does it imply that the UN Force is condemned to remain forever maintaining an unstable situation which can never find its equilibrium because of the very presence of the UN Force? (The relative strengths of the Greek, Turkish and UN forces suggest that war is not a strongly stable equilibrium otherwise the UN would have had greater difficulty and a considerable amount of fighting on its hands during the present uneasy 'non-outcome'.)

While the UN has done its best to rule out one of the possible outcomes, it has not done anything else to affect the structure of the conflict. A number of such attempts could be made (see Lumsden, 1966a) Some project much 'bigger' that the immediate conflict could lead to a channeling of interest into some 'super-ordinate' goals (Sherif, 1962) which, again with time, could lead to modified and more psoitive perceptions of the other community, and a subordination of the confict to new needs. Such an example might be if Greece, Turkey and Cyprus were incorporated into the European Economic Community - something we shall probably see in an case twenty years from now.[1] Just as economic sanctions are supposed to reduce the utility of a particular outcome, so could positive sanctions be used to to increase the value of an outcome. A number of economic incentives come to mind in the case of Cyprus. Recent events in Greece and in Cyprus have

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1. This suggestion was made to me by Dervish Kavazaglou, general-secretary of the Turkish Cypriot trade union organisation, shortly before he was assassinated by Turkish extremists. It is worth noting that Cyprus is a member of both the Council of Europe (and a signatory of the European Charter of Human Rights) and of the Sterling Area, so that membership of EEC would almost certainly follow British admission. Both Greece and Turkey are already Associate Members of the EEC.

almost certainly reduce the utility of Enosis for a large number of Greek Cypriots. Grivas, probably with the support of the junta in Athens, seems to have 'overplayed his hand', and has been removed from the scene. Events seem to moving in the direction of a more independent Cyprus, though it is too early to see signs of a détente between the Greek and Turkish Cypriot leaders. The peace-keeping force seems to reduce to a holding operation, damping the conflict, and enabling other important political interests to reach ascendency. It remains an open question whether it could do more in the direction of integrating the two communities, repairing the damage of the hostilities, and assisting the people of Cyprus in preparing for a more optimistic future.

3.4. Conclusion.

In this section the Cantril scale has been used to give a measure of the utilities of one of the participants in a conflict. Measures for the other participants were not available, nor was any attempt made to investigate the scale of values on which these judgements were made.

Two points must therefore be made claar. Firstly, game theoretic models assume conflicts of interest over common goals within an agreed value system. There is no reason, however, why judgements according to diffferent value dystems cannot be brought into the model at the level of preference orders, as long as this is made explicit. Secondly, much of the fascinating richness of the Cantril data lies precisely in the attempt to unravel different value systems amongst different levels of the populations in a range of countries from India and the Dominican Republic to West Germany, Israel and the United States.

The way is opened to analysing the extent to which conflicts between a rich nation and a poor nation, or two social groups, are conflicts of interest, perhaps open to bargaining and strategic analysis, and to what exent they are conflicts of value (see Aubert, 1963). In the latter case the value systems may be so different that each participant in a conflict may perceive the situation in a quite different way from that imagined by his opponent. In a world where a technologically advanced nation can intervene in the furthest corners of the globe, this kind of conflict presents a real threat, but one where research may make a great contribution.

Midgaard (1965), building on the work of Schelling, has emphasised the importance of factors 'transcending' the immediately-present game in theoretical analysis. Since the whole literature on the Prisoner's Dilemma game demonstrates the difference between theoretical analysis and actual behaviour, it remains for experimental analysis to be made of such transcending factors.

It is here that a major part of the Cantril technique, could be ut to good use, which was not done in the present studies. Cantril's test gives a coded score of a wide range of personal and national hopes and fears (see Cantril, 1965,'Appendix A: Coding', p.329). Respondents, before making ladder ratings, are asked to describe the anchoring points of the scale: that is, they are asked to describe their highest hopes and their worst fears. Their free-ranging responses are coded into 145 categories (34 concerning personal aspirations, 33 personal fears, 42 national aspirations, and 36 national fears). These categories resulted from extensive work with some 3,000 interviews collected from as wide a range of people possiblearound the world. Any item included by at least 5 percent of the people in any one nation are included in the final coding schema. The final version was carried out in the United States, West Germany, Yugoslavia, Poland, Brazil, Nigeria, India (both before and after the Sino-Indian border conflict in 1962), Israel, Israeli kibbuzim, Egypt, Japan, Cuba (15 months after the Revolution), Dominican Republic (after the assassination of Trujillo, before the overthrow of Juan Bosch), Panama and the Philippines. Interviews were also obtained with parliamentarians in the US, India, West Germany, Brazil, Nigeria and the Philippines. Respondents were classified according to age, sex, income, education, occupation and rural/urban habitation, many of the indicators of social position we use in Chapter 5.

Basic analyses of this wealth of data are made in Cantril's (1965) book, and it is clear that more could be done. Important additions could be made by further repititions of the studies: some very interesting changes between 1958 and 1963 are indicated by the two Indian studies, the only case where data is available at two points in time.

Much is heard of the 'revolution of rising expectations' in the developing countries, and the Cantril scale gives a clear measure of this. When one relates these expectations to the actual social and political

situation, the test would seem to be a good indicator of potential 'trouble'. The highest expectations of change were found in the Dominican Republic: developments since 1962 illustrate the clash of social hopes and political reality. High hopes were also found in Cuba. It would be very interesting to repeat the study in these two nations to compare the effects of their respective histories of the last five years: both may well prove prototypes for other nations in the developing world.

The Nigerian data, collected nearly five years before the civil war of 1967, show the fear of political instability and national disunity amongst a large proportion of the population.

While 'war with the Arabs' was a major fear of the Israelis, 'foreign aggression' was a major fear of the Egyptians (1960). The highest hopes of the Israelis for their nation were 'peace with the Arabs','technological advances', 'increase in population' and improved or decent standard of living'. The highest hopes of the Egyptians for their nation were 'decent standard of living', technological advances' 'national independence' and better education'. War was mentioned as a personal fear by 26 percent of Israelis and only 4 percent of Egyptians. The evaluation of the Arab-Israeli conflict in the value system of the two parties seems to be quite different. This is readily understandable when one considers the different historical, social, economic and political circumstances of the two, but the difference does not seem to have much influence on the political judgements of outside observers.

In other words, just as the utilities of our experimental subjects turned out to be different from those expected, so may the utilities of parties to a conflict be different from those imagined by each other, and by those passing judgement on them. There is, for instance, no sign here of the Egyptians having as their major hope the extinction of Israel. The repeated Israeli tactic of savage pre-emptive strikes and reprisals is likely to increase the Arab desire to remove Israel from their path to a decent standard of living and national independence, and thus act as a 'self-fulfiling prophecy'. (The Cantril data for Egypt was heavily biased in favour of those from the cities and with education, and so, though an attempt was made at appropriate weighting, cannot be regarded as fully comparable with the Israeli data. In neither case are we able to

assess the values of the leadership, which may of course be different from those of the common people.))

The work of Cantril and his associates may be regarded as an impressive and, from the methodlogical point of view, optimistic addition to the work of cross-cultural understanding. But much remains to be done to improve the research methods available. For instance, 29 percent of Israelis and 27 percent of Egyptians gave 'inadequate standard of living' as a fear; but in Israel Cantril gives the figure of $ 735 per capita income, and for Egypt $ 150. The category 'inadequate standard of living' is thus likely to mean quite different things. Similarly, 'health for self' is a major personal concern in both countries; but in Israel there is an average life expectancy of about 72 years, whereas the Egyptian can only expect to live about 51 years. The fear of illness in a developed country may be unrealistic (low probability) and little need be done about it. The fear of illness in a under-developed country may be highly realistic, but little can be done about it. In either case there may be little motivation to do anything about health problems. At an intermediate level of development knowledge of how to imrrove the situation may be available, but not the means - a hignly motivating situation.

Thus in a structural analysis we need to be able to relate the idealised hopes and fears of the individual to the concrete social, economic and political reality in which he finds himself. For a dynamic analysis we need to know the cognitive processes by which the individual or society sets about moving the concrete situation away from the worst fears in the direction of the highest hopes. Only then can we understand the behaviour. The attempt to attain new goals brings the individual and society into co-operation and conflict with hother similarly or differently motivated individuals, groups or nations. Thus social relations are essentially strategic. The role that the perceptions that the actors have of each other plays in their strategic thinking is discussed in the next chapter.

4. PERCEPTION OF THE ACTORS IN STRATEGIC THINKING.

4.1. The perception of persons as a strategic variable.

In strategic thinking the major variables are the choices and outcomes open to the actors - the situational variables that we referred to in the last chapter - and the actors themselves. Just as the player's perception of the structure of the situation is important in determining his choice, so is his perception of the players.

Game theory assumes that there are no differences between the players since they all operate according to the same ideal criterion of rationality. The experimental record, as we have indicated, shows that there are considerable differences in behaviour in the same strategic situation - that is, there must be psychological differences in the players. Some of these differences we shall take up in the next two chapters.

If there are differences between the players it is likely they will develop different perceptions of each other. These perceptions will in turn affect behaviour. A's behaviour will not only be influenced by his evaluation of the available outcomes, but also by what he thinks B will do; what he thinks B will do will depend on his assessment of B's capabilities, based on past experience, and the consequent positive or negative affect that he attaches to B.

Just as A's behaviour will in part depend on his perception of B, so will B's behaviour depend in part on his perception of A - and A may use this fact as a strategic variable. If A can create in B a particular impression of himself, this may help to determine B's behaviour, to A's advantage. We try to do this when we are interviewed for a job. A major part of the 'game' of politics seems to be to give an impression of strength and determination, and there is a consequent fear of appeasement. (Appeasement might be defined as allowing an opponent to see you as you are and not as you would like him to think.) The 'credibility' of a nuclear 'deterrent' depends not only on the technical capability of the weapons systems, but on giving the other side a sufficiently strong indication that one is prepared to use these weapons. Nuclear

strategy long ago became not only a question of military 'hardware', but also one of psychological 'soft-ware'. This even resulted in rival strategies - the 'counter-city strategy', representing a psychological (and political) threat, versus the 'counter-force strategy', representing a military threat to the opponent's ability to attack or retaliate.

In any strategic situation, whether a job interview or power politics, it is possible to create a 'wrong' impression. Perceptions are open to distortion by a number of factors, particularly in international relations (e.g. Bronfenbrenner, 1961; White, 1966). Insofar as experimental games are models of strategic situations, we should be able to use them to study systematically the genesis of person-perception (where there is no prior information) and the effects on behaviour (where there is a given prior perception of the opponent).

A word may be added about the use of the term 'perception'. Some psychologists prefer to reserve the word for sensory perception - the image created by direct sensory input. The way the term is used here it may sound to others more like an 'attitude' or a 'belief'. What expression to use for 'person perception' has been discussed for a long time, without any seeming consensus (e.g. Tagiuri, 1958). Without wishing to invest too much in the issue, the present use may be justified briefly as follows.

Perception psychologists have put increasing emphasis on judgemental processes in primary perception, for example using decision-theoretic concepts such as probability and utility to determine whether a signal is detected or not (e.g. Licklider, 1959). We are here trying to apply the same concepts (in both cases drawn from outside psychology) in the same way. We are suggesting that persons, like material objects and natural events, are a source of uncertainty in the environment, and what is important is how we seek to reduce this uncertainty. Sensory information is a part of the process, learning is another. The way we categorise the information about the situation we have here referred to as the 'perception' of the situation, and the way the information about the other persons is categorised is referred to as the perception of the players. When these perceptions are related to others in the individual's experience (e.g. other people, other places, other times, other situations) we may perhaps refer to the individual's image of the world, or his 'life-space'.

Just as (in Chapter 1) we conceived of information as having probability (H) and significance (S) components, so we conceive of the perception of persons in a strategic situation as having both cognitive and evaluative elements. This is similar to the distinction Fishbein (Fishbein & Raven, 1962; Fishbein, 1963) makes between belief and attitude. In his sense we are saying that actors develop and make use of both beliefs and attitudes about the other actors in the strategic situation. However, I prefer to use the terms beliefs and attitudes to refer to issues. I believe such a distinction could clarify much of the confusion in the literature on attitudes and public opinion.

We may take as an example a middle-class American citizen who favours the integration of whites and negroes. Integration is an issue, and the citizen has certain beliefs about what will happen in the event of integration, and he has a positive attitude towards it. But he may still perceive negroes as being dirty, lazy and unreliable. He may have a favourable attitude towards integration because he believes that negroes will become less dirty, lazy and unreliable if they are integrated; or he may believe that integration is the only way to avoid trouble in the northern cities of the United States; or he may have defined himself as a liberal and therefore have a positive attitude towards integration because it is a liberal issue. In each of these cases, no action may be necessarily required of the citizen, and integration may have no effect on his life.

Conversely, an attitude to an issue may affect the perception of persons identified with that issue. The good-looking, smartly dressed, and alert-looking soldier may be perceived as being cold, inhuman, aggressive and brutal by the Vietnam demonstrator, just as the discretely-dressed professor may be perceived as being long-haired, scruffy, unpatriotic, troublesome and dangerous by the policeman who arrests him on the same demonstration. Neither is likely to gain the support of the other for the issue, given such perceptions. Negative perceptions tend to lead to negative actions, though the proponents of non-violence have tried to point out that this need not be the case - sanctions can influence the other's behaviour by being positive as well as negative (e.g. Galtung, 1965). Clearly the need for cognitive 'balance', consistency or congruency (Heider, 1958; Festinger, 1957; Osgood, Suci, Tannenbaum, 1957) exerts a strong pressure, particularly when investment in the issue (Jahoda, 1959) is high.

An attitude or belief may be used to refer to a social group where that group is a symbol or object of a social issue. Attitudes and beliefs are shared between persons, they are cultural items which permit little testing against reality by direct interaction with the referents of the attitudes and beliefs. Here we are using the term perception to refer to the results of personal experience rather than acceptance of cultural items. To employ a game theory analogy, attitudes and beliefs determine who we play the game with, rather than how we perceive the person with whom we are playing the game. (On the Civil Rights issue in the United States there are indications that some groups do not want to change the rules of the game (society), but simply allow the Negroes to play (e.g. the National Association for the Advancement of Coloured People (NAACP), the White House); others who want to change the rules (e.g. the Student Non-Violent Co-ordinating Committee (SNCC), Students for a Democratic Society (SDS); and others who believe that the Whites and Negroes should play their own separate games (e.g. the Black Muslims). Who determines the rules of the game, and who plays, are major aspects of social reality which are totally ignored by game theory. The theory nevertheless allows us to see clearly these different aspects of the social situation.)

Attitudes or beliefs drawn from the culture in which we live may largely determine the perceptions of and behaviour towards persons who serve as referents to those attitudes and beliefs with whom we subsequently come in contact. A negative attitude may lead us to hostile behaviour which produces hostile behaviour in the other person, giving a 'reality-tested' foundation to the negative perception. A false belief, even with good-will, may result in offensive behaviour or questions, a snub from the other person, and a bad image of him. Education in human relations, 'turning the other cheek', etc., are various approaches to preventing this kind of viscious cycle of feedback between perception and action.

There seems to be general agreement in the literature that the perception of persons is not absolute but relative, so as to be in some way congruent (Osgood & Tannenbaum, 1955) with the needs, attitudes and traits of the individual. Thus Lerner & Becker (1962) showed that high school students chose partners who they perceived as being similar to themselves, in a game where both could win, and dissimilar in game where one player won at the expense of the other. Secord & Backman (1964) showed that not only similarity in attitudes in attitudes and traits but also similarity in perceived needs was associated with friendship.

Perceived similarity or dissimilarity is a function in large part of the self perception. Altrocchi (1961) found that the assumed dissimilarity between self and others of 'repressors' ('those who tend to use avoidance, denial and repression of potential threat and conflict as a primary mode of adaptation') and 'sensitizers' ('those who tend to be alerted to potential threat and conflict, to respond more readily with manifest threat and anxiety, and to use intellectual and obsessive defences') was more a function of differences in the self-evaluation of the two groups (sensitizers having more negative self-concepts than repressors).

On the other hand, some investigators have shown that the self-evaluation itself is a result of the comparison with others (e.g. Deutsch & Gerard, 1955). Gerard (1961) points to two types of social comparison. In one case a person directly compares his standing on an attribute with that of others; in the other case, he relates his self-evaluation to how he believes others regard him. Psychological measures of self-evaluation are thus likely to be in some degree a function of the test situation. The real self-evaluation of a subject is likely to be the result of a long-term development through the life of the individual (though only part of this may be reflected in the test situation). Wright & Tuska (1966), for example, have attempted to study not only the nature of 'feeling feminine', but also the origin, in terms of significant parent-child relationships.

A number of studies of the accuracy of person perception have been made (i.e. where perceptions are regarded as more absolute, rather than relative to the perceiver's self-perception). The findings of Gage & Cronbach (1955), Crow & Hammond (1957) and Stone & Leavitt (1954) were against the idea of a trait of sensitivity or accuracy in person perception. Cline & Richards (1960, 1961), however, report two studies showing 'modest correlations' with a general trait of accuracy. Murstein (1961), using the mean value of ratings assigned by groups of college men as a criterion, showed significant differences in accuracy (i.e. agreement with the criterion) between 'hostile' and 'friendly' and 'insightful' and 'non-insightful' groups. Smelser (1961) has shown that the degree of dominance attributed to the other player in a two-person co-operative game was a function of the subject's own dominance. Dominant subjects perceived their partners as less dominant, and submissive subjects perceived their partners

as more dominant than themselves. Bronfenbrenner, Harding & Gallwey (1958) make a distinction between sensitivity to the 'generalised other' (the group norm) and interpersonal sensitivity, pointing out that many studies confuse these two aspects. Particularly in the latter they found considerable differences between men and women dependent on whether the stimulus persons were of like or opposite sex. Men who were sensitive to other men seemed also to be sensitive to women; women who were sensitive to differences between other women seemed to be less sensitive to differences between men. Kates (1959) reports differences in first impression formation by high- and low-authoritarians.

These studies therefore add some support to the somewhat tentative conclusions of Bruner & Tagiuri (1954) and Taft (1955) in the reviews of the literature that the perception of people is something of a social skill, in which some people are more proficient than others. Nevertheless it is clear that it is important to consider various components of social perception, as recommended by Gage and Cronbach (Gage & Cronbach, 1955; Cronbach, 1958). Rather than seeking for generalised phenomena such as 'empathy' from the global data of dyadic relationships, Cronbach urges an analytic approach to the various strands of which social perception is made up, using a more sophisticated statistical analysis than a simple perceptual distance score.

In most of the studies above the reliance on more or less direct person perception means that it is difficult to control experimentally both the stimulus-determined and the perceiver-determined aspects of the situation. This is somewhat easier to accomplish in studies of indirect person-perception (e.g. Warr & Knapper, 1966a, 1966b). In such studies measures are typically obtained of a political figure, which are then mediated by newspaper reports (e.g. Warr & Knapper, op.cit.) or television programmes (Nordenstreng & Wiio, 1967) etc. The perceptions of the stimulus persons are then re-measured. In this way Warr & Knapper conclude that "although subjects with different expectancies perceive the same behaviour in different ways, the influence of expectancy is not so great that it overides the information presented in an intervening communication" (1966b, p.252). This conclusion is supported by a study of McGrath & McGrath (1962) who contrasted an 'image' theory of political perception

with a perceptual balance theory. Their results, from groups of partisan subjects, indicated that perceptions of political figures were stimulus-determined rather than perceiver-determined for a large number of attributes, giving much support to the 'image' theory. There were however some perceiver-determined attributes, particularly on the potency dimension.

These few examples from the literature are taken to illustrate that the field of person perception is still rather diffuse. While both perceiver and perceived are major determinants, little account seems to have been taken of the nature of the interaction between them, of the 'game' they are playing, or the role relationships, the degree of investment in the interaction, if any, and the past information or experience. There seems to be a gap between field studies of attitudes and public opinion on the one hand and experimental studies of behaviour on the other. Progress in science depends both on conceptualising the relationship of variables, and measuring these variables and their relationships. It is my belief that the concepts and methods now available, such as we have employed here, will enable progress in this area. The instrument used here to measure the perception of persons is the Semantic Differential (Osgood, Suci & Tannenbaum, 1957), and it is this which is discussed next.

4.2. The Semantic Differential (SD) as a measure of person perception.

The complexity of person perception has led to the advocacy of a number of measurement techniques. Beach & Wertheimer (1961) recommend recording the free responses of the subject and then applying systematic content analysis, rather than predetermined scales. Doob (1962, 1964), in his studies of nationalism in South Tyrol, used a number of techniques - confronting the respondent with a set of statements on cards to which they should comment; a sentence completion test; and essays written by elementary school pupils. The topics covered (which were much wider than the perceptions of the ethnic groups involved) were selected on the basis of considerable prior interviewing, newspaper reading and intensive discussions with a small number of intellectual leaders (methods used here in the field study in Cyprus).

Bannister and Fransella (1966) have used a form of person perception, employing the grid test, to study schizophrenic thought disorder. The patients are asked to rank (twice) eight photographs (four of men, four of women) on six constructs: kind, stupid, selfish, sincere, mean and honest. The constructs are selected by the investigators, and so do not necessarily reflect dimensions important to the subjects. Other investigators have used the Adjective Check List (Leary, 1957).

The problem in each case is to find indicators of the attributes which people perceive in others. Such attributes are likely to vary from person to person, and culture to culture; consequently so will the efficiency of the indicators in detecting the underlying dimensions. Probably the best general method in research is therefore to start with a 'free response' method, derive the most important dimensions, use these in the next stage of the research process, and refine them on the basis of the further results. That is, an 'Inductive-Hypothetico-deductive spiral' (Cattell, 1966) seems the most appropriate way of conceiving of the problem. If one is interested in measuring perceptions in a variety of social situations and cultures, then it is difficult to rely on a free response method, since the categories employed in the subsequent content analysis will probably vary. Similarly there are problems beyond those of simple translation in using an adjective check list, or an arbitrarily-selected set of constructs. In each case one must first resolve the question of the comparability of meaning systems.

For these reasons the Semantic Differential has here been employed. Not only does the SD provide measures of a rather sensitive kind, but it represents the most thorough attempt to determine the global dimensions of semantic space. It offers the possibility of a sophisticated psychological instrument which can be objectively applied in any culture, in a variety of situations, with a minimum reliance on the arbitrary choices of the investigator. (Not all studies employing the SD have lived up to these claims, including that reported here.)

The Semantic Differential became widely known with the publication of The Measurement of Meaning (Osgood, Suci & Tannenbaum, 1957). By now it can claim to be one of the most widely researched tools available to the psychologist. While one of the original studies used the SD to measure

the perceptions of political figures, the method is intended to measure the dimensions of general semantic meaning. The SD consists essentially of a set of scales of the type:

good :____:____:____:____:____:____:____: bad

warm :____:____:____:____:____:____:____: cold

Usually these scales are seven-point, as shown, and may be coded 1 to 7, or +3 to -3. Respondents are asked to rate on these scales a set of concepts (e.g. mother, hand, thief, egg, horse, punishment, sun, knowledge). The results are then subjected to factor analysis, to give the underlying dimensions: that is the scales are found to group themselves together, in a limited number of groups, where such a group of scales has a high inter-correlation, or 'loading' on a factor. An impressive number of studies have indicated three basic dimensions of meaning: Evaluation (good-bad), Potency (strong-weak) and Activity (active-passive). These three dimensions have been the basis of many subsequent applications of the Semantic Differential.

Maclay and Ware (1961) reviewed the literature on the cross-cultural results, showing the same or similar factors in Japanese, Korean, and a number of American Indian cultures. Triandis and Osgood (1958) have shown similar factors in Greek culture (our justification for using the SD in Cyprus). Burke and Nennis (1961) found three factors, accounting for 86% of the variance, in a study of changes in perception of self and others in a human relations training programme . Many studies have therefore taken these factors for granted and have not carried out a factor analysis, but have rather selected a few scales regarded as being heavily loaded on these three dimensions.

The importance if the Semantic Differential has been greatly increased by the subsequent researches of Osgood and his associates (see Miron & Osgood, 1966). In an attempt to make a systematic investigation of the generality of these dimensions some twenty languages, representative of all the major language groupings were selected In each language qualifiers, eventually to be used as scales were chosen, entirely intra-culturally, to avoidbiases from a predetermined set. (This is in contrast to the studies mentioned above, where the scales chosen were based on the original American studies.) The 60-70 most frequently used, diverse and independent qualifiers

were presented to each of ten judges proficeient in the language who were asked to say the antonym. (For the selection criteria, see Miron & Osgood, op. cit.) The 50 most clear-cut pairs were then expanded into seven-point scales like those above.

By similar procedures of selection 100 readily-translatable concepts were chosen, each to be rated on each of the 50 scales in each of the 20 language communities (using male high-school students as subjects). A 'pan-cultural' factor analysis, with varimax rotation, gave strong support to three-dimension structure.

While this is the situation for 'general' meaning (i.e. where the concepts are single, unrelated nound, drawn from a Thesaurus), evidence for an interaction between scales and concepts comes out when special sets of concepts are used. Thus in Suci's study of political concepts (Osgood, Suci & Tannenbaum, 1957) only two factors appeared (Benevolence and Dynamism). A study by Osgood, Ware and Morris (1961) of Morris's 13 'Ways of living' showed the usual three dimensions collapsing into a single Successfulness dimension. Miron and Osgood (1966) now suggest that the Activity dimension coalesces with the Potency dimension whenever 'activity' is not well represented in the set of concepts.

On the other hand doubt as to the generality of the three-factor structure has been cast by Kashigawa (1965), who applied a geometric vector orthogonal solution instead of a varimax rotation to some Japanese data of Sagara. In this study the Evaluative factor seemed to split into a Moral Correctness and a Sensory Pleasure factor. Ware (see Miron & Osgood, op. cit) had 40 personality concepts judged by 20 mature male and female subjects and found eight factors after varimax rotation.

One of the problems with the Semantic Differential was that it required a three-dimensional factor analysis (scales x concepts x subjects) and this was not technically possible until recently. The data block was therefore reduced in one way or other to two dimensions, usually by 'stringing out' the subjects' x scales. With a three-dimensional analysis it should subsequently be possible to study more effectively the groupings of concepts, and even the groupings of subjects (which so far have usually been homogenous groups such as high-school males). It is obvious from the results above that where we wish to use the SD for special purposes, as in studies of

person perception or political concepts, special analyses must be carried out.

Kashigawa's study showed that different methods of factor analysis and rotation should also be born in mind. By Cattell's (1966) standards three factors is very few, and it is surprising that only these factors should have resulted from so many studies, where only an orthogonal varimax rotation is typically used. (In the present studies, a varimax rotation resulted in seven factors in both the field and the experimental data.) If more complex factor structures are indicated in future research in 'special' situations, oblique rotation may be important in reducing the factors to maximum simple structure.

If people have a more (or less) differentiated semantic space depending on the nature of the concepts rated, it is conceivable that there are differences between cultures and individuals after all. In evaluating stimulus persons, values, or political concepts different dimensions may be utilised in different cultures, which may not be obvious from a factor analysis of 100 general concepts. It may be more than a coincidence that the ratings of Morris's 13 Ways (reflecting various values) factored essentially to Successfulness in the United States sample, whereas Kashigawa and Sagara find that Moral Goodness and Sensory Pleasure are important factors in Japan. (Successful-unsuccessful was employed as a scale in the present study, but there turned out to be no direct translation in Norwegian, a fact which may seem incredible to an Anglo-Saxon.) As yet there appear to be no good cross-cultural studies of the dimensions of meaning of specific sets of concepts such as persons.

Clearly cognitive similarity or dissimilarity, as reflected by dimensions of meaning (and perhaps by cognitive processes - see later) are important for communication between language and culture communities and their representatives. Rommetveit (1955) argued that acquaintance with the other person's dimensions was necessary to permit communication. Triandis (1960) gives support for the importance of cognitive similarity in communication in dyads. Mushakoji (1967) however had Americans and Japanese as negotiators in a simple international simulation and showed that the Americans were more issue-oriented, specific and universalistic

whereas the Japanese had a more empathic, diffuse and particularistic style. Where the two interacted there was a much longer 'learning' period, and much more uncertainty and unpredictability in the pattern of responses. One could imagine that, even if they shared the same dimensions for evaluating people, the participants' perceptions of each other would probably be different, if not mirror-images. If they had different dimensions, the differences in perception might be totally incomprehensible to each other, making communication impossible. The results of Osgood's 'pan-cultural' studies are optimistic from the point of view of international communication at the level of the most general meanings, but the interaction of scales and concepts means that much more work remains to be done when the meanings of specific sets of concepts, such as perceptions of people, values and political concepts, are the focal point of communication between nations and cultures. The full Semantic Differential technique presents the possibility of carrying out such systematic studies.

4.3. An experimental study of person perception in strategic thinking.

In the present dissertation the Semantic Differential was used to study the perceptions that the actors developed of each other and themselves after playing a series of 100-trial games, and that the participants in a real-life 'game' (the Cyprus conflict) had of the other participants. The studies reported by Miron and Osgood (1966), showing the potentialities of the SD as discussed above, have been published only after the present studies were carried out and initial analyses completed (Lumsden, 1966a, 1966b). These initial analyses were based on what might be called a 'first generation' use of the SD. The three dimensions, Evaluative, Potency and Activity, were taken as given, and scales were selected, on the basis of the American studies, thought to be both loaded on these dimensions, and relevant to description of persons. (The three dimensions are reported in Swedish and Greek languages communities. No studies had been done in Norway or Turkey. In the event only results from the Greek community in Cyprus were obtained.)

A 'second generation' application of the SD, as might now be considered by the author, would imply the prior selection of a much more representative set of scales, sets of concepts representative of the kind to be rated (in this case persons and ethnic groups), a factor analysis of the results to discover the major dimensions actually employed when rating such concepts in the language/culture under investigation and the loadings of the scales selected. Only then would the scales be used to measure the ratings of particular stimulus persons by a particular sample.

The importance of this more advanced approach is shown by the factor analyses of the two sets of data which are included here. In both cases seven factors were indicated, but the two sets of factors are very different, and bear little resemblence to the famous three found in studies of general semantic meaning. The results from the experimental study will be presented first.

4.3.1. The Semantic Differential ratings in four experimental games.

In the experimental situation the subjects were placed in separate rooms, with no knowledge of who the other player was. The intention was to measure, by means of the Semantic Differential, the development of the perceptions that the players had of each other as a function of their pattern of choices over the run of the game. No form of communication was allowed other than the results of each trial. Results are analysed therefore in terms of the patterns of co-operative and competitive responses of the partner relative to those of the player.

16 scales of the SD were chosen from Osgood, Suci and Tannenbaum (1957), the first 8 loaded on the Evaluative dimension, the next 4 on the Potency dimension, and the last 4 on the Activity dimension. (The same scales were used in the Cyprus field study.) There is little opportunity for 'activity' in the experimental situation, and it was intended that the Activity and Potency dimensions be combined for comparison into a Dynamism factor, as found in the Suci study of political concepts, and discussed by Miron and Osgood (op.cit.)

The scales were translated into Norwegian by a number of native speakers.

Some difficulty was found in translating 'successful', and the author now realises that the word chosen (heldig) means more 'lucky' or 'fortunate': it does not have the achievement conotation of the English word 'successful'.

Instructions for the SD for given to the subjects before the games began, and having read them they had to rate 'myself'. Subsequently, at the end of each game of 100 trials they had to rate 'the other player' and 'myself'. The scales, their loadings on the three factors (from Osgood, Suci & Tannenbaum, 1957) and the means and standard deviations from the experimental sample on the first self rating are presented in Table 4.1.

TABLE 4.1. Means and standard deviations of the SD scales for the initial Self rating.

	Scale	Factor	Loading[1]	Mean[2]	Standard Deviation
1.	Good-bad	Evaluative	1.00	3.27	1.08
2.	Altruistic-egoistic	"	.31	4.43	1.43
3.	Sociable-unsociable	"	.42	2.83	1.66
4.	Kind-cruel	"	.52	2.83	0.99
5.	Honest-dishonest	"	.50	2.13	0.97
6.	Successful-unsuccessful	"	.51	2.93	1.28
7.	Intelligent-unintelligent	"	.40	2.70	1.06
8.	Congenial-quarrelsome	"	.49	3.06	1.17
9.	Strong-weak	Potency	.40	3.13	1.28
10.	Severe-lenient	"	.43	3.77	1.61
11.	Brave-cowardly	"	.34	3.13	1.22
12.	Masculine-feminine	"	.47	3.47	1.83
13.	Active-passive	Activity	.98	3.10	1.75
14.	Excitable - calm	"	.26	4.23	1.91
15.	Intentional-unintentional	"	.23	3.30	1.58
16.	Difficult-easy	"	.25	4.97	1.61

1. From Osgood, Suci & Tannenbaum, 1957.
2. Scores are from 1 to 7.

A subsequent factor analysis (principal axes, with varimax rotation) of the self-rating only shows little sign of these three factors (Table 4.2.). Instead there is a strong first factor (37.7%) combining some of each of the Evaluative, Potency and Activity factors into what might be called a Dynamism factor (good, sociable, lucky, sympathetic, strong, brave, severe, and active). There are four other factors (Kaiser test) with much smaller loadings accounting for 37.0% of the variance. The second is a 'Nastyness' factor (bad, cruel, quarrelsome, egoistic); the third is 'Easygoing-ness' (lenient, calm, easy); the fourth is 'Capability' (good, intelligent, severe, deliberate); and the fifth is perhaps 'Chivalry' (honest, strong and masculine).

TABLE 4.2. Factor analysis of initial 'self' rating (principal axes with varimax rotation).

Scale	Factor 1	2	3	4	5
1. good-bad	.43	-.44	-.17	.42	.30
2. altruistic-egoistic	-.02	-.84	-.07	.06	-.04
3. sociable-unsociable	.89	-.25	.13	.05	.03
4. kind-cruel	.11	-.67	-.11	.25	.31
5. honest-dishonest	.11	-.31	-.31	.06	.64
6. successful-unsuccessful	.70	.14	-.26	.34	.32
7. intelligent-unintelligent	.33	-.25	-.13	.74	.08
8. congenial-quarrelsome	.52	-.66	.08	.05	-.04
9. strong-weak	.62	.03	-.23	.27	.46
10. severe-lenient	.46	.10	-.38	.52	.21
11. brave-cowardly	.72	-.26	.00	.24	.20
12. masculine-feminine	.20	.04	.15	.19	.80
13. active-passive	.95	-.07	-.11	.03	.08
14. excitable-calm	.34	-.01	-.85	.00	-.12
15. deliberate-unintentional	-.01	-.10	.16	.93	.05
16. difficult-easy	-.38	-.21	-.75	.00	.31

When all the ratings of self and other are combined in a factor analysis the factor structure looks very different (Table 4.3.). The large first factor dissappears and seven smaller factors result, taking out only 59.9% of the variance (Kaiser and Scree tests of the number of factors (see Cattell, 1966); the scree test might suggest one more factor, but certainly no fewer). (The scores are first standardised to mean 4.0, sigma 1.0)

TABLE 4.3. Factor analysis (varimax rotation) of 9 'self' and 'other' ratings.

Scale	Factor 1	2	3	4	5	6	7
1. good-bad	.15	.68	-.14	.11	.04	.19	.05
2. altruistic-egoistic	-.27	-.40	-.23	.27	-.30	.17	.06
3. sociable-unsociable	.02	-.06	-.01	-.14	-.03	-.04	-.85
4. kind-cruel	-.01	.02	.03	.03	.75	.02	-.01
5. honest-dishonest	.20	.11	.19	-.12	-.12	-.56	-.17
6. successful-unsuccessful	-.75	-.05	-.10	-.19	.06	-.20	.18
7. intelligent-unintelligent	-.08	.14	.30	-.71	.06	.00	-.10
8. congenial-quarrelsome	.11	.10	.15	-.16	-.05	.70	-.05
9. strong-weak	.36	-.14	.06	-.30	.04	.28	.49
10. severe-lenient	-.06	-.04	.71	.19	-.17	-.07	.32
11. brave-cowardly	.03	.10	.30	.70	.34	-.12	-.07
12. masculine-feminine	-.05	-.11	-.15	.03	.65	.00	.05
13. active-passive	-.06	.18	-.76	.21	.01	-.11	.17
14. excitable-calm	-.17	-.12	-.05	-.44	.07	-.44	-.14
15. deliberate-unintentional	-.78	.01	.10	-.00	.02	.16	-.22
16. difficult-easy	-.13	.72	-.06	-.06	-.16	-.07	-.02
CUMULATIVE PERCENTAGE	11.40	21.91	30.68	39.00	46.57	53.56	59.90

The first factor might be called 'Misfortune' (unintentional, unsuccessful (unlucky), strong); the second 'Determination' (difficult, good, egoistic); the third 'Stoicism' (passive, severe, intelligent, brave); the fourth 'Innocent Heroism' (unintelligent, brave, calm, weak); the fifth 'Self-confidence' (kind (the Norwegian word snill is somewhat broader in usage, almost 'nice'), masculine, brave, egoistic); the sixth 'Good-natured Amorality' (congenial, dishonest, calm, strong); and the seventh 'Toughness' (unsociable,

strong, severe).

These dimensions would seem to be appropriate to the circumstances, and much more subtle than those of Evaluation, Potency and Activity. The interesting question arises as to whether these new dimensions are specific to the situation, or to the type of subjects (Norwegian psychology students); but this remains a topic for further research. We might ask whether people employ different dimensions when judging themselves than when judging others; whether these seven dimensions are used in general by Norwegians when evaluating people; and whether other people use the same dimensions in the same situation, and in different situations. Such perspectives are an important product of the current research, but clearly they imply a very different approach in the next piece of research.

4.3.2. The relations between the Semantic Differential ratings and the response patterns.

The major interest in this study was to examine the relation between the patterns of responses of the players and their perceptions of each other. The measures of perception were taken at the end of each 100-trial game, so that the causal direction is from behaviour to perception. There is at least as much interest in the reverse direction, the effect of the perception on behaviour, but no attempt was made to study that here. We assume that there is a continual interaction between action and perception, and the present research must be regarded as only a preliminary attempt to study the nature of this interaction.

Table 4.4 shows the results of an analysis of variance (16 scales x 4 games x 30 subjects x 2 sets of ratings). A significant source of variance due to the subjects disappears when the scores are standardised as presented in Table 4.4. The main source of variance is clearly the scales, rather than the subjects or the games. There is also significant variance due to the interaction of scales and games, scales and subjects, games and subjects, scales, games and subjects, subjects and ratings, scales, subjects and ratings, and games, subjects and ratings.

That is, when a rating is made on a given scale on a given occasion, it is firstly important which scale is chosen. But then it is not so much

TABLE 4.4. Analysis of variance of 'self' and 'other' Semantic Differential ratings over four games.

	Source of Variation.	Sums of Squares.	Degrees of Freedom.	Mean Squares.	Ratio of Variances.	Probability.
1.	Scales	416.491	15	27.766	52.45	<.01
2.	Games	1.597	3	0.532	1.06	>.05
3.	Scales x games	62.174	45	1.382	2.53	<.01
4.	Subjects	19.680	29	0.679	1.27	>.05
5.	Scales x subjects	688.224	435	1.582	2.26	<.01
6.	Games x subjects	349.118	87	4.013	7.58	<.01
7.	Scales x games x subjects	908.450	1305	0.696	1.32	<.01
8.	Ratings (self/other)	4.469	1	4.469	6.20	<.01
9.	Scales x ratings	12.474	15	0.831	1.57	>.05
10.	Games x ratings	2.435	3	0.812	1.53	>.05
11.	Scales x games x ratings	24.698	45	0.549	1.02	>.05
12.	Subjects x ratings	7.562	29	0.260	4.92	<.01
13.	Scales x subjects x ratings	535.282	435	1.230	2.33	<.01
14.	Games x subjects x ratings	60.392	87	0.694	1.31	.01-.05
15.	Within variance	690.810	1305	0.529		
16.	TOTAL	3779.386	3839			

a question of which subject is making the rating, or after which game, but which subject on which game. This is appropriate for the use to which we are putting the SD ratings, since we are interested in the relations between the ratings and the pattern of choices - which of course is a function of which subject is playing which game.

Table 4.5 shows the correlations between the the subjects' own proportion of co-operative choices (Cs), the opponent's co-operation (Co), the difference between the two (Cd), and the SD ratings for self and other.

TABLE 4.5. Correlations between subjects' own choices (Cs), the opponent's choices (Co), the difference (Cs-Co=Cd), and the Semantic Differential ratings.

Scale	Self ratings			Other ratings		
	Cs	Co	Cd	Cs	Co	Cd
good-bad	-.01	-.08	-.02	-.02	.07	-.09
altruistic-egoistic	-.21	.04	.57	-.12	-.09	.14
sociable-unsociable	-.08	-.01	.01	.00	.55	.09
kind-cruel	.03	-.00	-.03	-.01	-.16	-.13
honest-dishonest	.08	-.04	-.01	.63	-.07	.09
successful-unsuccessful	.44	-.09	.01	-.20	-.02	.59
intelligent-unintelligent	.11	.61	.15	-.01	.17	.07
congenial-quarrelsome	.15	.02	-.02	-.07	.03	-.04
strong-weak	-.08	.05	.02	.05	-.05	-.10
severe-lenient	-.17	.07	-.11	.05	.72	-.00
brave-cowardly	-.05	-.20	-.10	.66	-.13	.07
masculine-feminine	.60	-.17	.13	-.12	-.05	.86
active-passive	.01	.10	-.03	-.15	.01	-.09
excitable-calm	.03	.56	.13	.01	.03	-.06
deliberate-unintentional	-.13	.02	.65	-.10	.06	.08
difficult-easy	.11	-.08	.03	-.10	.01	-.07

Significant at the .05 level where r is larger than 0.381
" " " .01 " " " " " " 0.463

Table 4.5 shows that six of the scales (good-bad, kind-cruel, congenial-quarrelsome, strong-weak, active-passive, difficult-easy) do not have significant correlations with any of the measures of co-operation. This includes the 'key' scales for the Evaluative, Potency and Activity factors. Ten of the scales have significant correlations. Two scales seem to correlate significantly with each measure of co-operation, one such pair (successful-unsuccessful, and masculine-feminine) occuring twice. The results may be summarised as follows:

- where the subject's level of co-operation was high he characterised himself as successful and masculine and the other as honest and brave;
- where the opponent's co-operation was high, the subject characterised himself as intelligent and excitable, and the other as sociable and severe;
- where the subject was more co-operative than the other he characterised himself as altruistic and deliberate and the other as successful and masculine.

The correlations could also be explained in the opposite direction:

- where the subject's level of co-operation was low he characterised himself as unsuccessful and feminine and the other as dishonest and cowardly;
- where the opponent's co-operation was low, the subject characterised himself as unintelligent and calm, and the other as unsociable and lenient;
- where the subject was less co-operative than the other he characterised himself as egoistic and unintentional and the other as unsuccessful and feminine.

In order to investigate these relationships further, an additional factor analysis was performed. The sixteen self ratings, the sixteen other ratings on the Semantic Differential, and the three measures of co-operation, were treated as thirty-five separate variables (the maximum accepted by the program available at present). The thirty-five variables reduced to 8 factors. Of these only three included the measures of co-operation, and are exactly the same as the second, third and fourth explanations above. The remaining factors showed relations between the self ratings and the other ratings which had no relation to the levels of co-operation (Table 4.6).

Thus Factor I is where the subject is more co-operative than the opponent and rates himself as altruistic and deliberate, and the other as masculine and successful. In these situations the more co-operative

TABLE 4.6. Rotated factor matrix of self and other ratings with indices of own co-operation, other's co-operation and the difference in co-operation.

Scale	Factor 1	2	3	4	5	6	7	8
Self ratings								
good-bad	.00	.12	-.02	-.06	.04	.07	.71	.33
altruistic-egoistic	.80	.08	.01	.15	-.12	.07	.02	-.10
sociable-unsociable	.11	.02	-.05	.04	.07	.62	-.03	-.33
kind-cruel	-.05	-.00	-.03	-.02	.82	-.01	-.12	.18
honest-dishonest	.06	.81	-.10	-.16	.00	-.02	-.01	-.09
successful-unsuccessful	-.09	-.27	-.03	-.55	.04	-.03	-.01	-.36
intelligent-unintelligent	.10	-.14	.82	-.14	.01	.07	-.01	.09
congenial-quarrelsome	-.01	.07	-.03	-.09	.01	-.12	.78	.14
strong-weak	-.03	.03	.03	.05	.79	.10	-.05	-.08
severe-lenient	-.05	-.04	.08	.16	.02	.83	.00	.02
brave-cowardly	-.04	.81	-.23	.05	.06	-.06	.15	.02
masculine-feminine	.03	.01	-.08	-.81	-.11	.01	-.04	.09
active-passive	-.06	.01	.17	.04	.04	.03	.82	.02
excitable-calm	.05	.01	.84	-.01	.01	-.05	.04	.03
deliberate-unintentional	.81	.04	.06	.04	.05	.01	-.09	-.08
difficult-easy	-.04	-.01	-.07	-.16	.79	-.01	.18	.10
Other ratings								
good-bad	.06	.84	.09	.01	-.02	-.06	.02	-.18
altruistic-egoistic	.11	-.07	-.02	.11	.81	-.02	.11	-.06
sociable-unsociable	.05	.03	.81	.02	-.10	.09	.15	.38
kind-cruel	-.07	-.08	-.10	-.07	.01	.80	.05	.05
honest-dishonest	.01	.04	.03	-.83	.02	-.02	-.10	.03
successful-unsuccessful	.81	-.02	-.01	.09	.10	.02	.05	.19
intelligent-unintelligent	.09	-.04	.07	.07	.08	.23	.67	-.40
congenial-quarrelsome	.03	.79	.05	-.03	.03	-.08	.06	.21
strong-weak	-.05	-.02	-.02	-.09	.04	.79	.02	-.10
severe-lenient	-.07	.00	.87	.04	-.03	-.08	-.01	-.15
brave-cowardly	-.02	.11	-.02	-.79	.02	.05	.03	.11
masculine-feminine	.93	-.04	-.04	.01	.01	.02	-.00	.02
active-passive	-.01	.84	.07	.13	-.04	.05	-.06	.11
excitable-calm	-.01	-.03	-.04	.12	-.07	.02	.77	-.28
deliberate-unintentional	.08	.07	.01	.08	.81	.03	-.03	-.16
difficult-easy	.02	-.04	.07	.05	-.03	.85	-.02	.30
Subject's co-operation	-.12	-.05	.05	-.86	-.03	-.07	.07	-.10
Partner 's co-operation	-.03	.00	.83	.13	.00	-.03	.01	-.19
Difference	.87	-.08	.08	-.16	.06	-.10	-.01	-.01
CUMULATIVE PERCENTAGE	11.4	22.2	32.5	42.5	51.7	60.0	67.8	71.1

(altruistic) player loses to the (successful) less co-operative player. Factor III is where the opponent is high on co-operative choices and is rated as sociable and severe (strict) by the player, who sees himself as intelligent and excitable. The fourth factor is where the low-co-operation player sees himself as unsuccessful and feminine, and the opponent as dishonest and cowardly. In this situation, either the partner is also low on co-operation, in which case both will be unsuccessful, or the opponent is more co-operative and sees himself (Factor I) not as dishonest and cowardly, but as altruistic and deliberate, and the player as successful and masculine. The low co-operation subjects characterise both themselves and the other player in negative terms, whereas the high co-operation subjects employed essentially positive terms.

The Prisoner's Dilemma and similar games seem, therefore, to produce a psychological conflict. The players who see themselves as unsuccessful and feminine (who may of course be women - see Chapter 5), may attempt to be more successful by competing. If they compete against another competitive player, a viscious circle may arise, in which neither can be successful, and negative perceptions of each other arise - which may reduce the possibility of achieving a co-operative solution. On the other hand, the competitive player may be opposed to one who attempts to co-operate, in this situation taking the role of 'sucker' or 'chicken'. In this 'double bind' situation, the opponent can never be seen in a positive light, whatever his behaviour. This seems to occur in a number of other human relationships.

The other factors, which do not relate to the co-operation indices, are briefly:

II. Self: honest, brave; other: good, sympathetic and active;
V. Self: kind, strong and difficult; other: altruistic, deliberate;
VI. Self: sociable, severe; other: kind, strong, difficult;
VII. Self: good, sympathetic, active; other: intelligent, excitable;
VIII. (smaller loadings) Self: good, unsociable, unsuccessful; other: sociable, unintelligent and difficult.

The first four factors take out 10-11 per cent of the variance each, whereas the last four account for progressively less. The apparent similarity of several of the factors may be a function of the method we have used (stringing out the four sets of ratings). A larger sample, or an oblique rotation, may well have produced more simple structure.

Some findings reminiscent of these effects are reported by Swingle (1966). In a different type of two-person game he found that an an un-co-operative partner resulted in a reduction of the subject's level of co-operative responding when the partner was either liked or unknown, but the initial level was maintained when the partner was known and disliked. There was a significant difference between two Semantic Differentials after a 'harm' (low co-operation by partner) phase for the 'dislike' group, where negative ratings were made of the partner, although the subject did not change his behaviour: that is, retaliation was negatively related to negative attitude change.

An experiment might be designed where the SD ratings were made more frequently, and the behaviour of the 'partner' (actually a collaborator of the experimenter) was systematically varied. The effects would presumeably be related to the personalities of the subjects, and such an experiment would present an opportunity to investigate the correlates of personality. Which kinds of subject react to the given situation by retaliative behaviour, and which by negative perceptions of the opponent? Are these reactions predictable from other psychological tests? If so, how are such people distributed in the general population?

The perception that A develops of B on the basis of B's behaviour seems only in part to be a function of B's behaviour. The perception also seems to depend on the reaction of A, which may be determined by internal constraints as well as external ones due to the nature of the situation. These relationships require further investigation with a more adequate multivariate design than that achieved here.

4.4. Perceptions of people in conflict: a field study.

The intention of using an instrument such as the Semantic Differential was that it could be applied in social situations in different cultures, yet have a rationale based on laboratory experimentation. This represents something of an ideal which is some way from being achieved, but in the field study of Cyprus an attempt was made to use the same set of Semantic Differential scales which were used in the laboratory to investigate the perceptions that the major groups involved in the Cyprus conflict had of each other. Of

particular interest was the United Nations 'peace force' in Cyprus. In theory (but not entirely in practice) this might be imagined to be a new group in such a situation, so that there was no previous experience on which to base perceptions and expectations. If a measure such as the Semantic Differential could be used in such a conflict it could conceiveably act as a 'thermometer', which could be 'dipped' into the local population at regular intervals to give a continuous measure of how the force was being perceived. If there is something in the perceptual distance theory, for instance, one would imagine that the UN force should be rated in a neutral position between the conflicting parties, by both parties. Regular measures might show whether the force was being seen as moving more to 'our' side or more to 'their' side. It might be hoped to make the same measures of the perceptions that the UN soldiers have of the local population, to see whether they had a more favourable impression of one side or the other.[1] Just as in the experiment differences in behaviour may effect the perceptions created, so it may be imagined that different 'strategies' of peace-keeping, as well as the general behaviour of the troops, effect the perceptions created. These perceptions might be of crucial importance to the success or failure of the peace-keeping mission. This at least was the reasoning behind the present study.

4.4.1. Procedure.

The same sixteen scales of the Semantic Differential that were used in the experimental study (section 4.3), using Norwegian students as subjects, were used as a measure of the perceptions that two groups of Greek Cypriot high school students (section 3.3.3) had of themselves and five other groups directly or indirectly involved in the Cyprus conflict: the Turkish Cypriots, Scandinavians (Swedes, Danes and Finns are in the UN force), the United Nations Force in Cyprus (UNFICYP), and the Americans. These groups were presented to the subjects one at a time, without them knowing which was coming next. There own group was presented last. The tests were introduced with

1. The author is involved in a large scale study of Norwegians who have participated in UN forces in Gaza and Congo. A very much curtailed form of the Semantic Differential is being used in the hope of measuring such perceptions. There continue to be considerable political objections to it, a major reason for the modifications, which have involved removing the negative poles of the scales, and ending up with a positive adjective check-list. It is hoped to compare the full SD with the modified version in a separate study.

standard instructions.

For practical reasons the pairs of words making up the SD scales were written on the blackboard by the teacher, the words having been previously translated into Greek. The fact that the scales were chosen to be on various dimensions was explained to the translators to assist in determining shades of meaning. The subjects made their judgements on sheets of paper containing sixteen scales of the type:

1. :_____:_____:_____:_____:_____:_____:_____: 1.

The number at each end of the scale referred to the word pair which was written on the blackboard.

As mentioned previously, even after initial permission was received from the Turkish Cypriot authorities, it did not prove possible to get the tests carried out.

4.4.2. Results.

Results were obtained from a sample of thirty-four high-school students in Limassol and forty-four in Nicosia. The scores were first standardised and then factor analysed (principal axes, with varimax rotation). This analysis produces seven factors, taking out 56 per cent of the variance (Table 4.7).

These factors might be called Gallantry (strong, lenient, good), Passive Masculinity (masculine, passive, kind), Dishonesty (dishonest, brave), 'Good-for-nothing' Sociability (sociable, bad, passive), Self-assurance (congenial, calm, acgive, egoistic), Luck (successful, unintelligent, excitable, unintentional), and Capriciousness (difficult, unintentional, egoistic, excitable).

These factors, in spite of their differences, have some similarities to the Norwegian factors. It is not possible to determine from this study whether the differences are simply a function of the different sets of concepts rated, or whether there are stable underlying cultural differences. This could be the subject of a fascinating further study.

Of interest here are the differences in the perceptions of the various groups involved. To do this the mean ratings on each scale are multiplied by the factor loadings for each factor and summed. The results for each group are presented in Table 4.8 separately for each sample.

TABLE 4.7. Rotated factor matrix of 16 Semantic Differential ratings of British, Scandinavians, Americans, UN Force in Cyprus, Greek Cypriots and Turkish Cypriots, by two samples of Greek Cypriot high-school students

Scale	Factor 1	2	3	4	5	6	7
good-bad	.49	-.18	-.04	-.39	.04	.21	-.11
altruistic-egoistic	-.15	.15	.19	-.11	-.31	.18	-.50
sociable-unsociable	.00	-.11	.02	.81	.14	.08	.01
kind-cruel	-.02	.50	.09	-.21	.13	-.11	.30
honest-dishonest	.11	-.13	-.70	.18	-.18	-.09	-.18
successful-unsuccessful	.04	-.07	.17	-.03	-.07	.76	-.14
intelligent-unintellignet-	-.12	-.06	.27	-.10	-.27	-.52	-.06
congenial-quarrelsome	-.10	.10	-.04	.10	.73	.17	.11
strong-weak	.73	-.00	-.25	-.00	-.08	.03	.11
severe-weak	-.64	-.12	-.25	-.10	-.03	.15	.07
brave-cowardly	.10	-.20	.67	.29	-.17	-.07	-.05
masculine-feminine	-.03	.73	-.08	-.07	.13	.06	-.11
active-passive	-.19	-.57	-.01	-.37	.33	.04	.01
excitable-calm	-.15	-.05	-.25	.00	-.59	.41	.32
deliberate-unintentional	.03	-.11	-.03	-.01	.00	-.32	-.56
difficult-easy	.05	-.01	.12	-.06	-.07	-.16	.66
CUMULATIVE PERCENTAGE	9.7	18.7	26.7	34.3	41.9	49.3	55.9

Figure 4.1 shows the ratings for each group diagramatically. It is clear that there is very close agreement between the Limassol and Nicosia samples, though there are some differences. The differences do not seem to be in any way systematic, either as to degree of extremity of the judgements in general, or as the ratings of particular groups.

The assessments of the various groups might be summarised as follows:

- British: quite gallant, dishonest, self-assured, quite lucky, and capricious;
- Scandianvians: dishonest, unsociable and unlucky;
- UN Force: ungallant, quite dishonest, quite sociable, un-self-assured and uncapricious

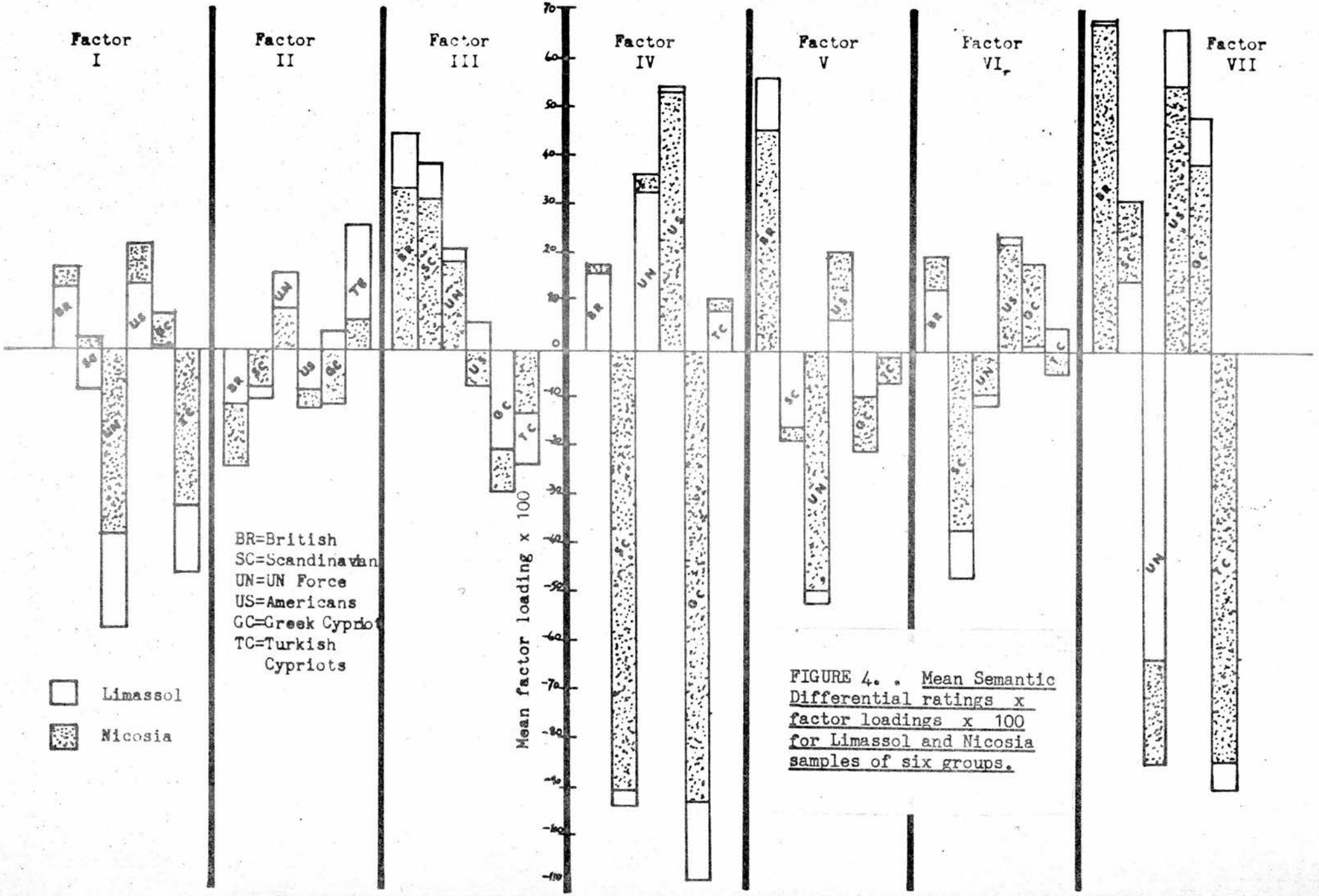


FIGURE 4. . Mean Semantic Differential ratings x factor loadings x 100 for Limassol and Nicosia samples of six groups.

TABLE 4.8. Ratings for each group on each factor.[1]

Group	Factor 1	2	3	4	5	6	7
Limassol sample							
1. British	13.00	-10.88	45.23	16.97	56.72	13.48	67.95
2. Scandinavians	-8.71	-9.67	38.78	-93.37	-15.40	-46.79	14.38
3. UN Force	-57.24	16.29	21.00	33.56	-51.43	-10.60	-64.59
4. Americans	13.84	-8.33	5.98	55.05	7.05	23.64	67.00
5. Greek Cypriots	0.67	4.00	-20.18	-108.85	-9.15	0.32	48.07
6. Turkish Cypriots	-45.63	26.16	-22.97	8.76	-0.40	4.48	-90.79
Nicosia sample							
1. British	17.29	-23.57	33.71	17.42	45.99	19.24	67.92
2. Scandinavians	2.86	-7.29	31.43	-90.94	-18.88	-37.08	31.02
3. UN Force	-38.26	8.59	18.91	37.23	-49.73	-9.20	-85.20
4. Americans	20.19	-11.67	-7.20	54.41	21.19	22.26	54.73
5. Greek Cypriots	7.17	-11.18	-28.66	-92.20	-20.13	18.80	38.91
6. Turkish Cypriots	-32.34	6.58	-12.49	10.83	-5.49	-5.20	-84.64

1. The figures in the table represent the deviations of the mean ratings for each group on each scale from the standardised mean (4.00) multiplied by the factor loading of that scale on the factor, multiplied by 100, and summed over the 16 scales.

- Americans: gallant, quite masculine, sociable, quite self-assured quite lucky, and very capricious;
- Greek Cypriots: honest, unsociable, lacking in self-assurance, quite lucky, and rather capricious;
- Turkish Cypriots: ungallant, passively masculine, rather honest, and uncapricious.

4.4.3. Discussion.

The high degree of similarity between the two sets of ratings may be taken as a measure of the reliability of the method. The Limassol sample received the tests from their teacher in the presence of the author. The Nicosia sample carried out the tests several weeks later, under the supervision of a Greek Cypriot educational psychologist, in the absence of the author, who thus had no control over the administration of the tests. That is, the tests were administered to different samples, by different people,

at different times, and yet produce essentially similar results.

Clear distinctions are made between the various groups rated on the different factors. Sometimes a group may be seen as similar to the reference group, at other times very different. For example, the Scandinavians are seen as rather similar to the Greek Cypriots on IV and V, but very different on factors III and VI. Table 4.9 expresses the scores as differences on each factor (d scores) and sums the differences into a 'general difference' (D) score.

TABLE 4.9. Difference scores for each group by each sample on each factor.

	1	2	3	4	5	6	7	D
Limassol sample								
British	12.33	14.88	65.41	125.82	65.90	13.16	19.88	317.38
Scandinavians	9.38	13.67	58.96	15.48	6.25	47.07	33.69	184.50
UN Force	57.91	12.29	41.82	142.41	42.28	10.92	112.66	419.65
Americans	13.17	12.33	26.16	163.90	16.20	23.32	18.93	274.01
Turkish Cypriots	46.30	22.16	2.79	117.61	8.75	4.16	138.86	340.63
Nicosia sample								
British	10.12	12.39	62.37	109.62	66.12	0.44	29.01	290.07
Scandinavians	4.31	3.89	60.09	1.26	1.25	55.88	7.89	134.57
UN Force	45.43	2.59	45.57	129.43	29.60	28.00	124.11	406.73
Americans	13.02	22.85	21.46	146.61	41.32	3.46	15.82	264.54
Turkish Cypriots	39.51	4.60	16.17	103.03	14.64	24.00	123.55	325.50

Because of the conflict situation in Cyprus the most important relation is that between the Greek and Turkish Cypriots. The Turkish Cypriots are the group which the Greek Cypriots might be expected to have the most experience of, but Table 4.9 shows that, not surprisingly, the Turks are perceptually very distant from the Greeks. However, this is mainly due to Factors IV and VII (Sociability and Capriciousness), and to a lesser extent Factor I (Gallantry). The Greeks see themselves as very low on the Sociability factor, and the Turks as low on the Capricious and Gallantry factors. The Limassol sample see the Turks as close to the Greeks on Factor III (Honesty) and Factor VI (Luck). Here there

are divergences with the Nicosia sample, which rather sees the Turkish Cypriots as close on Factor II (Passivé Masculinity).

The terms used to try to describe the factors are not very satisfactory. 'Passive masculinity' and 'sociability' seem to be important factors which are not adequately tapped by the adjective scales chosen. The latter especially seems to have negative connotations not necessarily implied by the term 'sociability'. When the two factors are put together the result might be the type of man who sits in the coffee-shop all day long chatting, drinking and gambling, rather than doing a good day's work. While the Turks are rated higher on the first factor, and the UN Force higher on the second factor, this image seems to characterise both. This seems to be a not uncommon way for an achievement-oriented group to describe a lower status, economically worse off, minority group in the same society. The perception, in other words, may be as much a function of the general 'topdog-underdog' relationship as due to the overt fighting and political differences. In socio-economic terms the selected samples chosen may represent the potentially most distant from the Turkish Cypriots. (Though until the 1963 fighting there had been some Turkish Cypriots attending the Nicosia school. They would, however, be 'elite' Turks, so that general perceptions of the Turks might not be influenced and these would be reinforced by the group consensus resulting from the open conflict and split between the communities.)

Because of the increasing commitment to the concept of United Nations peace-keeping forces by the Scandinavian governments, Canada, Netherlands, Britain, and some other countries, the role of the UN Force in Cyprus is of particular interest. It is the only remaining such force and in operational terms the most successful. Yet there is no sign of it achieving a situation in which it can leave again.

The most obvious finding of all here is that the UN Force is perceptually very distant from the Greek Cypriots - more so than the Turkish Cypriots, much more so than the British and Scandinavians who make up most of the force. The UN Force is seen as particularly distant on Factors I, IV and VII (Gallantry, Sociability - which we suggest has overtones of 'bad morals', and Capriciousness - on which the Force is very low). The UN Force is also seen as rather high

on the Dishonesty factor, though not so high as the British and Scandinavians.

As discussed elsewhere (Lumsden, 1965) one of the major activities that the local population observe of the UN Force is indeed when they spend time drinking beer or coffee outside the coffee-shops. Whereas in Limassol there was little UN activity (because there was little fighting between the two communities), in Nicosia the UN soldiers on duty may be seen lounging in windows of the houses along the 'Green Line' and other points of tension. Of course there is little else for them to do just there, but in the centre of the city they are much more visible than when they are actively involved in stopping and preventing potentially serious incidents in other parts of the Island.

It must also be pointed out (as pointed out to me by the late Commander of the UN Force, General Thimaya, some months after the data was collected) that prior to the data collection the UN Force had been subject to unbased accusations in some of the Greek press, resulting from a series of bomb attacks in Nicosia. The President (in his religious capacity) later discovered (by confession) the source of the attacks, but nothing was done to repair the image of the UN Force.

It is not possible, therefore, to establish the cause of the negative perceptions of the UN. They certainly existed at that point in time, both as illustrated in the data presented here, and coming out in interviews. Both sides, seemed to want the Force to remain, and even to do more - but mainly more to help their cause. The Greeks, in the data here, rate the UN Force as close to the Turkish Cypriots on a number of the factors. Some evidence suggests that the UN soldiers have on occasion stepped over the boundary line of neutrality into the Turkish camp - which raises the question of the perceptions that the UN soldiers have of the local population and the origin of these perceptions. This is the subject of an ongoing investigation and cannot be taken up here.

The Scandinavians are perceived as being closer than the British. This may be because they have less information about Scandinavians than British, and so judgements are more neutral. Both groups are distant, however. For practical considerations

ratings were not obtained of the Swedes, Danes and Finns separately (the Scandinavians participating in the UN Force) and other contingents, the Irish and the Canadians. A number of interviews suggested that the Irish were the most popular contingent, followed by the Canadians and Finns, then the Swedes, Danes and British. Such an order of preference follows the order of socio-economic distance on seven indicators, presented elsewhere (Lumsden, 1966). This suggests the hypothesis, which deserves further investigation, that peace-keeping forces should be less above, rather than more above the 'kept at peace' in socio-economic status. Clearly, there are also important political considerations, which are not discussed here. But these are not unrelated to the socio-economic ones. UN contingents may also be distinguished on the grounds of 'professionalism': the British, Irish and Canadians are regular army units, the Scandinavians short-term service volunteers taking a change from civilian life - with attractive pay as a means of recruitment.

In brief, there are a number of explanations for these perceptions which are important for United Nations peace-keeping, but need not be discussed further here.

The attempt has been made to show that, insofar as the perceptions that the actors in a strategic situation have of each other are an inportant variable determining the nature of the interaction, the Semantic Differential, both in experimental and field studies, promises a sophisticated means of measuring those perceptions. It is a means, moreover, that can be methodically adapted to use in different language and culture communities. However, it is clearly not adequate to accept the assumption of three simple dimensions where a specific set of concepts, such as ethnic groups, is to be rated. This implies that the set of scales must be properly selected in the given culture, in order to be representative of the underlying factors, and not just 'imported' as was done here. The study presented here was intended as a pilot study, and as such seems to have done its job. It is still hoped to overcome the difficulties in the way of a more adequate main study.

5. SOCIAL POSITION IN STRATEGIC THINKING

5.1. Introduction.

The review of the literature in the first chapter showed that 'internationalists' in the Prisoner's Dilemma and related games give more co-operative responses than 'isolationists' (Lutzker, 1960; McClintock, 1963); men more than women (Rapoport & Chamnah, 1965); students from a large university less than students from a small college (Oskamp & Perlman, 1965, 1966); younger children behave differently from older children, Negro children differently from white children, lower socio-economic status children from higher socio-economic status children (Sampson & Kardush, 1965); and socially rigid people are less co-operative than socially open people (Dencik & Wiberg, 1966).

With these findings in mind we went on to point out that even greater socio-economic differences are characteristic of the international system, something of great significance for much political and military strategic thinking. Two psychological measuring instruments, well-tried in a wide range of cultures, were adapted to provide a means of measuring how the actors in a strategic situation perceive the structure of the situation and how they perceive each other, in the belief that these two kinds of perception are two of the major variables in the strategic situation. Though the experiments above did not control the perceptions of the situation and the players, the simple experimental games employed cannot be expected to result in wide perceptual differences. It seems clear therefore that there are differences in strategic thinking, as reflected in behaviour, related to the social background of the players. It is this phenomenon which will be explored in greater detail in this chapter.

The social differences mentioned above are many of the indices of what sociologists (e.g. Galtung, 1964b) have called social position. Galtung models society as a series of concentric circles, having a centre and a periphery. The centre of society is characterised by such things as living in a city; living in the central area of a country; being between the ages of of 30 and 60; having more than primary education (in Norway, from the age of 7 to 14); having an occupation in the secondary or tertiary economic sectors (manufacturing and services, as opposed to primary production); having a

skilled or professional occupation (sometimes described as 'white collar' as opposed to 'blue collar'); being a man. The periphery implies a lack of these attributes. An operational justification for regarding these as indicators of social status has been given in a number of studies (e.g. Galtung, 1964b). For example, more women said they would prefer to be a man if they had the choice than men said they would prefer to be a woman; more people living in the country said they would prefer to live in the town than people living in the town said they would prefer to live in the country; etc. The items may be constructed as an additive index, each with the values 1 or 0, giving a range of 0 to 8.

This index has been shown to have systematic relationships to a range of attitudes not only in Norway, but also in France and Poland in a comparative study using national samples (Halle, 1966), and in a number of other countries (e.g. Schwartzman & Araujo, 1966, in Latin America). Galtung suggests that the consistencies in the data are such as to suggest generalised cognitive differences between the centre and the periphery. The centre is characterised by gradualism, pragmatism and partial acceptance or rejection of the status quo; the periphery shows a high degree of absolutism, moralism and total acceptance or rejection.

On the basis of these and the previous findings it seems reasonable to expect a relationship between the social position index and behaviour in experimental games of the Prisoner's Dilemma type. A systematic investigation of this hypothesis is not possible here, though the influence of social position on the (limited) group of experimental subjects is examined. Before a systematic study is attempted it is felt that greater conceptual clarity should be achieved about the nature of the proposed 'generalised cognitive differences', particularly the relation between the way people express an attitude and their behaviour. This point is discussed at the end of the chapter.

5.2. An experimental study.[1]

1. This section is a revised version of a paper presented at the Annual Conference of the British Psychological Society, Belfast, 6-10 April, 1967, and published as PRIO publication No. 1-6 from the International Peace Research Institute, Oslo, in the Journal of Peace Research, 1967, pp.289-303.

Of the thirty subjects who took part in the experiment twenty-seven completed the questionnaire used in the Three-nation study mentioned above. This gave measures of social position as well as of attitudes and knowledge of international affairs. Some of the items give indications of extremity of viewpoint and can be compared directly with the results from a national sample of the general population. Measures on the Self-anchoring Striving Scale also give a measure of extremity of viewpoint. The relationship between social position and the ladder-ratings is discussed in section 5.2.2, and between social position, attitudes and knowledge of international affairs in section 5.2.3. Section 5.2.4. relates social position to behaviour in the Prisoner's Dilemma game.

Section 5.2.5. relates the ladder-ratings to the level of co-operation in the PD game; part 5.2.6 relates the attitude and knowledge scales to the level of co-operation.

Thereafter the findings are discussed in relation to a number of theoretical considerations, and a distinction is proposed between cognitive style and cognitive mode. The former refers to thought processes causing attitudes to be expressed in different ways, which complicates the methodology of attitude scaling in heterogenous groups. The latter refers to the different kinds of logic employed by different individuals or groups in a given behavioural situation. The distinction is employed here to show that the findings in the present experiment may bear a less contradictory relationship to other findings than at first appears.

5.2.1. Social position characteristics of the sample.

The social position index is generally made up of some eight items: age, sex, income, occupation (sector of economy), occupation (skilled-unskilled), education, ecology (urban-rural), ecology (central-peripheral). These factors were determined in the questionnaire for the present sample. It is obvious however that students have a limited range of social position, so that discrimination on that basis is limited. For this reason, the father's position was taken on indicators of occupation, ecology and education. Information was not available on income. Table 5.1 shows the distributions of the sample according to both their own social position

and that of the father, compared with the distribution for the national smmple. Sex is the only factor which discriminates the students (line 1 of table 5.1) so line 2 adds to the sex and age of the student the position of the father on the other indicators.

It can be seen from Table 5.1 that not only are the students restricted in range on their own social position, but that they also come from a somewhat narrow section of the population.

TABLE 5.1. Distribution of the experimental subjects on (1) their own social position, (2) their sex and age plus the father's occupation, education and ecology, and (3) the distribution of a national sample (in per cent).

	Social position	0-1	2	3	4	5	6	7	(8)	SUM	(N)
1.	Students(- income)	0	0	0	37	63	0	0	-	100%	(30)
2.	Age & sex of students plus father's social position on occupation, education & ecology.....	0	0	15	33	45	7	0	-	100%	(27)
3.	National sample (Norway, Nov.-Dec., 1964).....	3	8	18	22	22	14	9	4	100%	(1000

We may now compare the students' own social position with that of the father to see whether the differences are reflected in their attitudes and behaviour. Are their attitudes and behaviour as homogenous as their social position, or are there differences related to their social backgrounds? Where does the social position of the father make itself felt - and where not?

5.2.2. Social position and Self-Anchoring Striving Scale results.

The Self-Anchoring Striving Scale (see Chapter 3) designed by Cantril (1965) and his associates gives a measure of the hopes and fears for the future as a function of the individual's present and past situation. Respondents are asked to describe their highest personal and national hopes and fears, and then to imagine these as the end-points of a 0-10 ladder-scale. They then record where on

the ladder they are now, where they were five years ago, and where they expect to be in five year's time. The ladder-ratings for the experimental subjects are presented in Table 5.2.

TABLE 5.2. Ladder-ratings of 29 Norwegian psychology students according to sex.

Ladder-rating	Men (N=18)	Women (N=11)	Means (N=29)
Personal ratings:			
1. Position 5 years ago	5.67	5.54	5.63
2. Position now	7.56	7.54	7.55
3. Position in 5 years	8.45	8.90	8.65
4. Change in last 5 years	1.89	2.00	1.93
5. Change in next 5 years	0.89	1.36	1.07
National ratings:			
6. Position 5 years ago	6.28	6.00	6.17
7. Position now	6.73	7.00	6.83
8. Position in 5 years	7.12	7.81	7.38
9. Change in last 5 years	0.44	0.91	0.62
10. Change in next 5 years	0.61	0.82	0.98

Comparisons for men and women show that women have lower ratings for both themselves and the nation five years ago but have a greater degree of expected improvement in both cases, more particularly on their personal ratings. This might reflect greater relative actual improvement attained and expected; greater need for achievement, satisfied by reaching university (women are greatly in the minority at the University of Oslo); or simply a less cautious approach to making such judgements. Some of these points will be taken up later. However, even if the assumptions of significance tests were satisfied, the differences between men and women are not significant statistically.[1]

In interpreting the data it must be borne in mind that only two subjects were rated at social position 6, and one of these had atypical responses, thus making the average for the 6's most unreliable. There were only four respondents at level 4, but their responses were

1. See Cantril (1965), p.360. The data here are not from a large enough sample to use the tables provided by Cantril, even if they satisfied the other criteria. Differences of 1.0 to 1.5 are in general significant for samples as small as 50.

much more consistent with each other. Ratings by social position are shown in Table 5.3.

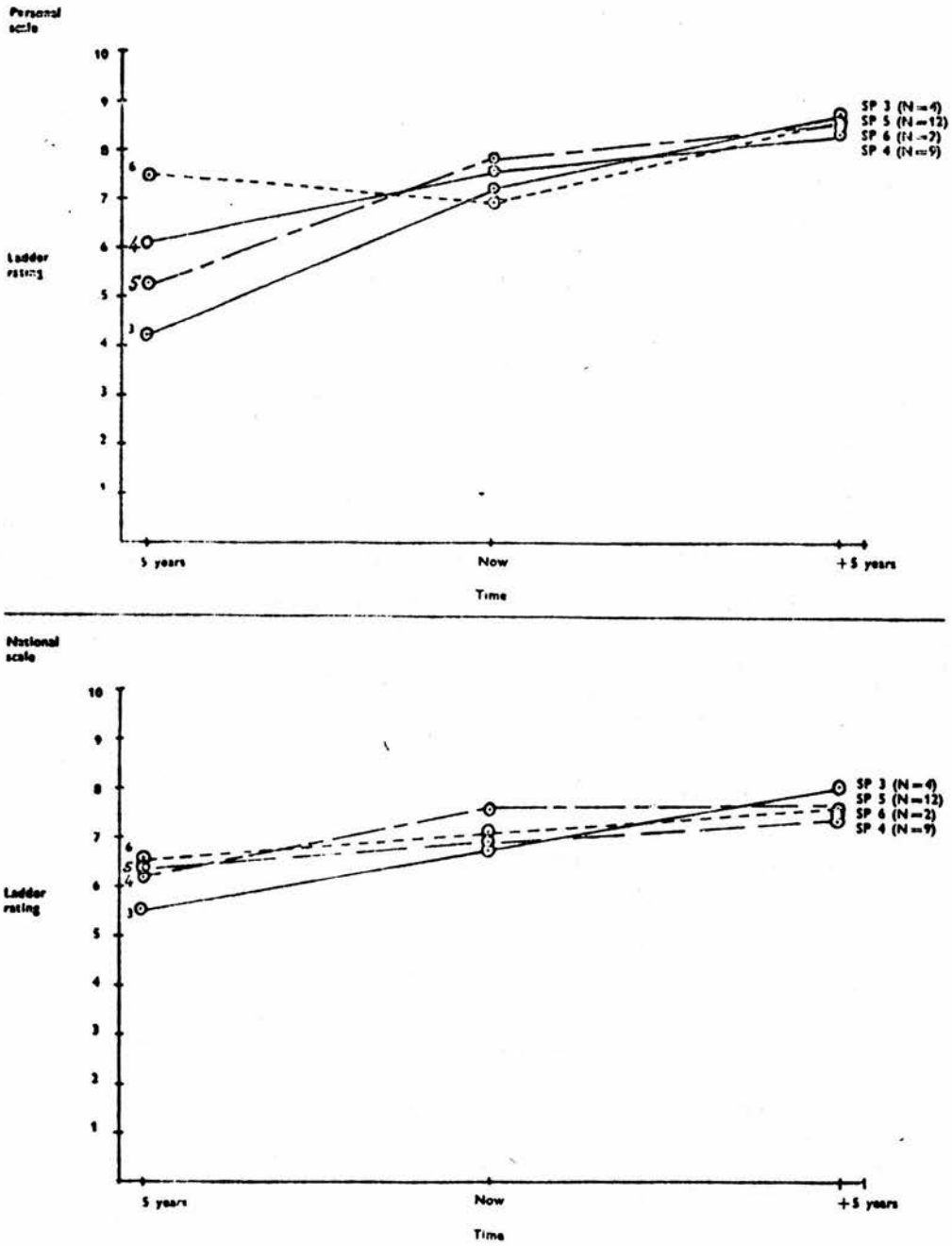
We shall not discuss the two 6's much except to say that they are obviously not only high on the scale, but rare - only two out out of thirty. Unlike all the other groups they do not seem to indicate much improvement in the last five years - one even rated himself worse off now. However, their personal and national ratings are high and remain high. This we might expect from people high on the status ladder, people who might be described, following Cantril (op.cit. p.308) as in 'phase 5' - ' general satisfaction with a way of life achieved which promised continued development'.

The 3's have low ratings for five years ago, both for themselves and for the nation. Relative to their scale of values they now see themselves as much better off, an improvement which they see as continuing into the future both for themselves and for their nation. Their experience and expectation of change seem to be greater than for any other group. This is shown clearly in Figure 5.1.

TABLE 5.3. Ladder-ratings of the experimental subjects as a function of social position.

Ladder-rating	Social position 3 (N=3)	4 (N=9)	5 (N=12)	6 (N=2)	Means (N=27)
Personal ratings:					
1. Position 5 years ago	4.25	6.12	5.33	7.50	5.84
2. Position now	7.25	7.56	7.73	7.00	7.55
3. Position in 5 years	8.75	8.45	8.66	8.50	8.65
4. Change in last 5 years	3.00	1.38	2.42	-0.50	1.71
5. Change in next 5 years	1.50	0.89	0.92	1.50	1.10
National ratings:					
1. Position 5 years ago	5.50	6.45	6.43	6.50	6.14
2. Position now	6.75	6.89	7.51	7.00	6.83
3. Position in 5 years	8.00	7.34	7.57	7.50	7.65
4. Change in last 5 years	1.25	0.56	0.50	0.50	0.69
5. Change in next 5 years	1.25	0.45	0.75	0.50	0.82

Figure 1. *Ladder ratings against time for social position of 27 Norwegian psychology students*



On the personal ratings there are gamma correlations of -0.55 and -0.63 on the past and future ratings of change with social position, i.e. the higher the higher social position, the less likely the subjects are to see themselves as better off. On the past and future national ratings of change, the correlations with social position drop to - 0.25 and -0.16 respectively.

Figure 5.1 suggests that the 4's have smaller expectations of change than might be expected compared with those at other social positons. The 4's are more optimistic regarding themselves than the 5's, but less optimistic regarding change in the nation. This does not show on the graphs because, while the more of the 4's expect to be better off than the 5's, they make more moderate judgements about how much better off they expect to be.

On the personal ratings (Figure 5.1) there is a wide divergence on the past ratings and a striking convergence on the future ratings. It may be that education, by leading to a common status, is also a great leveller of expectations.

5.2.3. Social position, knowledge and attitudes to foreign affairs.

Ten items of the questionnaire were taken as indicators of 'internationalism', and fifteen as indicators of knowledge of foreign affairs.[1] Table 5.4 gives the mean scores on these scales against social position. There is a slight linear decrease with increasing social position on internationalism, but no obvious trend on knowledge. In each case the difference in the means is very small. The factors themselves covary (contingency coefficient, C = 0.33; Chi-square = 3.25, which gives p just greater than 0.05).

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1. The 'internationalism'scale was simply several of the questions taken from the Three-nation public opinion study. No claim is made for it other than the apparent face validity. It is not standardised in any way, so that comparisons with Lutzker (1960) and McClintock et. al. (1963) may be invalid. The questions were: Be so kind as to tell me which of the two news items you would like to know more of in this list of imaginary items (New disarmament proposal at Geneva; rising price of bread in Norway; the independence of a new African state; local elections in Norway; a new development of the situation in Vietnam; Norwegian football championships: two items to be chosen). How often would you say that you: talked about the international situation with someone? Listened to the foreign news

TABLE 5.4. Mean scores on internationalism and knowledge of international affairs against social position.

	Social position			
	3 (N=4)	4 (N=9)	5 (N=12)	6 (N=2)
Internationalism	7.50	7.45	6.84	6.50
Knowledge	12.25	12.50	12.00	13.50

on the radio of television? Read the foreign news in a newspaper? How long would you say you spent reading the newspaper yesterday? In lands the world over official government expenditure is discussed; what do you think about our Government's position in the following fields: do you think they should spend more, about the same, or less? (Military defence; development aid to lands in Africa, Asia and Latin America). Would you recommend that a part of the Norwegian armed forces be incorporated into a permanent force under the control of the UN? How do you think most of the money to the developing countries should be given, if we should give it? (Direct from rich lands to poor lands; from the rich lands to an international organisation and afterwards let it decide how it should be used in the developing countries; both ways).

The 'knowledge' scale was also made up of several items from the questionnaire: In which of the following towns does the UN have its headquarters? (Geneva, New York, Washington, Vienna, elsewhere). In the summer of 1963 a treaty was signed in Moscow between the USA and the Soviet Union. What did the treaty deal with? (A joint programme of space research; a ban on certain nuclear tests; a solution of the Cuba problem). In the following list of lands, could you say which are members of NATO, which of the Warsaw Pact, and which do not belong to either? (Austria, Bulgaria, Norway, Poland, Czechoslovakia, France, Spain, Finland, Turkey). Who is the Chancellor, or Prime Minister, of West Germany? (Lübke, Adenauer, Ulbricht, Erhard). Here is a list of African leaders and African lands. Can you say who belongs to which? (Nasser, Ben Bella, Tshombe, Haile Selassie; Egypt, Congo, Ethiopia).

For the very interesting comparisons on these and other items between representative national samples from Norway, France and Poland, see Halle, op.cit. A report of the study also appears in Unesco Courier, August-September, 1967, pp. 5-9, where the results of a number of the questions are reproduced.

TABLE 5.5. Distribution of men and women on internationalism and knowledge of foreign affairs.

	Internationalism		Knowledge	
	High	Low	High	Low
Men	9	8	13	4
Women	4	6	2	7
	gamma = 0.25 chi-square = 0.43 $p > 0.50$		gamma = 0.83 chi-square = 7.4 $p < 0.01$	

Table 5.5 shows the distributions of men and women on the two scales, split above and below the mode. It can be seen that in this sample there is no relationship between the sex of the respondent and 'internationalism', though there is a clear relationship between sex and knowledge of international affairs. McClintock and Turner (1962) note a similar finding in a study of 661 students from ten southern California institutions of higher learning.

These scales do little to discriminate between the students on the basis of social position, a conclusion which is substantiated by inspection of the individual items. The student sample was homogenous in its views, and Table 5.6 shows that in comparison with the general population it was also somewhat more moderate and gradualistic on a typical item.

TABLE 5.6. Student responses compared with the national Norwegian sample (1964) on the question: "Thinking of war, peace and disarmament, what do you think the world situation will be like in five years and in twenty years?"

	In 5 years		In 20 years	
	Student group (%)	National sample (%)	Student group (%)	National sample (%)
War	-	3	3	10
More armament	22	16	7	10
About as now	48	49	3	16
Partial disarmament	15	20	60	23
Total disarmament	-	1	-	11
Don't know	15	10	27	29
No answer	-	1	-	1
SUM	100	100	100	100

It can be seen that there are very few extreme judgements in the student sample, regardless of social position. The 'don't knows' which would be expected to increase with decreasing social position do not in fact do so in the student sample. Inspection of the data shows no relation between social position and expectations of more or less disarmament.

We may distinguish two major influences on the student: the home and social background (meausred here in terms of the father's ecological, educational and occupational position), and the educational and social processes leading to his being a student. The latter seem to be the predominant influence on his verbally expressed attitudes.

5.2.4. Social position and level of co-operation in a Prisoner's Dilemma game.

As described in earlier chapters, the experimental subjects played a series of experimental games, one of which was the Prisoner's Dilemma. The payoffs (in Norwegian øre) were as follows:

		Player B	
		C	D
Player A	C	5, 5	-10, 10
	D	10, -10	-5, -5

Because sex is the main discriminating factor in the social position index when applied to the present sample it is again treated separately. Table 5.7 shows a clear relationship between the level of co-operation and the sex of the subject (as shown by Rapoport & Chamnah, 1965, Dencik & Wiberg, 1966,and others). Table Table 5.8 removes sex from the index and takes only the indicators of the father's social position, showing a weak but positive relationship between level of co-operation and social position (gamma = 0.28).

The results show that not only are there wide differences in the level of co-operation in the Prisoner's Dilemma game, but that these differences relate to the sex and social background of the subject. The international attitudes of the same sample were found to be homogenous and unrelated to social background or sex.

TABLE 5.7. Level of co-operation and sex of subject.

Level of co-operation	Women	Men	SUM
Low	6	3	9
Medium	3	6	9
High	1	8	9
SUM	10	17	27

gamma = 0.71

TABLE 5.8. Level of co-operation against social position as determined by education, occcupation and ecology of father only.

Level of co-operation	Social position 3	4	5	SUM
Low	4	3	2	9
Medium	5	2	2	9
High	1	6	2	9
SUM	10	11	6	27

gamma = 0.28

Since the women did not know they were playing other women, there may have seemed to them a higher probability that they were playing against a man, as there were more male students in the class. Women, even in contemporary society, still tend to be treated as underdogs, and they are correspondingly sensitive on the point in many cases. They may be more determined therefore than the men to show that they cannot be 'beaten into submission' by a few losses (CD and DD), but once they have established the point (DC) they are prepared to co-operate (see Chapter 2).

Such an effect was noted by Borah (1963). He used a version of the Deutsch and Krauss (1960) trucking game and played low status subjects against high status subjects, showing that the former were more determined not to submit. On the other hand, Rapoport and Chamnah (1965) found that mixed-sex pairs were intermediate in co-operation between the more co-operative all-male pairs and the less co-operative all-female pairs. Kanouse and West (1967) informed their

subjects neither
/of the 'sex' of the partner on a random basis and found that/ sex of subject nor sex of partner had a significant effect on choice. However, this experiment was (i) a one-trial experiment, and (ii) involved imaginary rather than real money payoffs. It is not clear from the published results whether 'sex of partner' implied 'same sex' versus 'other sex', or was rather the four groups male with male partner, male with female, female with male and female with female. Bixenstine, Chambers and Wilson (1964) using an asymmetric game, where the payoffs were different for the two players, thus giving more 'status' or 'power' to one of the players, found clear sex differences, with the females reacting strongly against the lower status position.

There are thus two aspects: a difference in status may reduce attempts at co-operation; whether the difference in status of the sexes is sufficient amongst students to explain the differences in the PD game is not certain. The effects of differences in status are important because of the possible consequences for 'top-dog - under-dog' conflicts in the international system.

Vinacke (1959) and Uesugi(1963) in a situation involving bargain-within a triad found that females were more likely to resort to rules and agreements that made competition unnecessary, to bargain relatively little in the more competitive types of relationships and to withdraw themselves from the negotiations, permitting the other two to form a coalition without interference. In either case we do not see much sign of strategy-oriented thinking in women compared with men. It is interesting to note that Singer (1964) found a correlation between grade scores and a measure of 'Machiavellianism' in men and 'attractiveness' in women. Obviously, in experimental situations where no communication is allowed (visual or other), Machiavellianism is at an advantage, attractiveness (or any other factor depending on personal contact) is not.

To summarise: we have yet to determine precisely (i) the consequences for strategic behaviour of unequal status in a given strategic situation, and (ii) the consequences for strategic behaviour of long-term socialisation in social positions of different social status.

5.2.5. Ladder-ratings and level of co-operation.

When the self-anchoring scale results are tabulated against the level of co-operation in the Prisoner's Dilemma there are no clear relationships except in the case of the ratings for the position of the nation in five years' time. As shown in Table 5.9 there was a strong tendency for those of the subjects who expected the nation to stay the same or get worse to be high on co-operation, those who expected the nation to be better to be low on co-operation.

TABLE 5.9. Expectation for the nation in five years' time against level of co-operation.

Level of co-operation	The nation in 5 years: Same or worse	Better	TOTAL
Low	1	8	9
Medium	4	6	10
High	6	4	10
TOTAL	11	18	29

gamma = -0.63; tau = -0.22.

If these results are then split according to sex we find that this relationship holds true for women much more than for men (Table 5.10).

TABLE 5.10 Expectation for the nation in five years against level of co-operation by sex of subject.

Level of co-operation	The nation in 5 years: Men		Women	
	Same or worse	Better	Same or worse	Better
Low	1	2	0	6
Medium	3	4	1	2
High	4	4	2	0
SUM	8	10	3	8
	gamma -0.20; tau-0.06.		gamma -1.00; tau -.40.	

It can be seen that the group which has high expectations for the nation and low co-operation is almost exlcusively women (six out of eight). Of the women who thought that the nation would be the same or worse, none are in the low co-operation group, whereas none of the women in the low co-operation group thought that the nation would be the same or worse. This group of women might be referred to as the 'low C, high ratings for nation' group, and in Table 5.11 they are split according to social position, showing a clear relationship.

TABLE 5.11. Social position of women in the low C, high ratings for nation group.

	Social position			
	3	4	5	SUM
Low Co-operation, high ratings	3	2	1	6
High Co-operation, Low ratings	1	1	2	4

gamma = 0.52; tau = 0.20

The low C group of women may now be compared with the high C group on the question of the conditional probabilities of choosing C after each of the four possible outcomes in the Prisoner's Dilemma. These have been shown to vary with sex (Rapoport & Chamnah, 1965), and it can be seen from Table 5.12 that they may vary within sexes.

TABLE 5.12. Conditional probabilities of C following each of the outcomes for two groups ofwomen.

	C/CC	C/CD	C/DC	C/DD	MEAN C
Low Co-operation, high ratings	27.6	16.0	28.8	31.6	28.3
High Co-operation low ratings	82.0	58.0	42.2	36.6	57.4

First, Table 5.12 makes clear that the difference in level of co-operation is great: 28.3 per cent compared with 57.4 per cent. Secondly, the response to DD outcomes is very similar - but for the low C group this gives the highest probability of choosing C on the next trial. The low C group are least likely to choose C following a CD outcome (i.e. one where they lose and the other player wins),

whereas the high C group are least likely to respond with C following a DC outcome (i.e where they have won and the other player has lost). The high C group's co-operation is consistently higher, but is particularly high after a CC outcome, whereas for the low C group the chance of following a CC outcome with C is almost the lowest.

It seems clear that what is reflected here is not simply a difference in the overall level of co-operation but in addition a quite different way of reacting to the situation. While responses to the tests, such as judgements on the self-anchoring scale, may be at least partially due to differences in cognitive style - a tendency to make more or less absolute verbal judgements - the behaviour here seems to show that there may also be differences in cognitive mode: that is, differences in the logical basis of the strategic thought involved, resulting in quite different kinds of response.

5.2.6. Internationalism, knowledge and level of co-operation

We shall compare the level of co-operation with the scores on the internationalism and knowledge indices: the usual hypothesis, following Lutzker (1960) would be that high scores on internationalism and knowledge of international affairs were good predictors of co-operative behaviour in the Prisoner's Dilemma game.

In Table 5.13 the indices of internationalism and knowledge are each rated 0 or 1 according to whether the respondent was below or above the mode. We see that while none of the low scorers on both

TABLE 5.13. Internationalism and knowledge against level of co-operation.

Level of co-operation	Internationalism & knowledge				
	0 - 0	0 - 1	1 - 0	1 - 1	SUM
Low	2	1	1	5	9
Medium	6	1	-	2	9
High	-	4	2	3	9
SUM	8	6	3	10	27

internationalism and knowledge are in the high co-operation group, the great majority (six out of eight) fall into the medium co-operation group, not the low group as would be expected from the Lutzker hypothesis. On the other hand the largest group in the low C category was that with high scores on internationalism and knowledge, which was the largest proportion of the high-scoring group.

These results suggest that there is not a linear relationship between co-operation in the PD game and attitudes expressing internationalism. The data suggest rather that those low on internationalism and knowledge are not the lowest on co-operative responses, and that it is possible to be high on internationalism and knowledge and to choose a strategy of competition in the game.

Of the six low C women with high expectations for the nation, referred to earlier, two were in the 0 - 0 group and two in the 1 - 1 group on internationalism and knowledge. Of four medium and high C women, three were low on internationalism, and one was high on internationalism but low on knowledge. Again we see no direct relationship between internationalism and level of co-operation, though there were clear signs of a negative relationship between expectations for the nation and C response rate.

5.2.7. Discussion: Social position, cognitive style and cognitive mode.

It should be made clear that absolutism/gradualism is not the same as internationalism/isolationsim: it is as possible to be gradualistically isolationistic as it is to be absolutistically internationalistic. Galtung's theory of public opinion formation does not say that people at the centre of society are necessarily more internationalistic, but rather that they express their views in more moderate tones if they are. In this discussion a brief attempt will be made to point to some of the dynamic factors behind the expression of opinions and the possible relationships to behaviour.

There are a number of plausible explanations of sociological differences in public opinion.

1. One is the hierarchical structure of society, where the

communication channels are controlled from the centre, but with many filters which effectively remove all the 'ifs and buts' by the time ideas get to the periphery. (For an account of filters in the transmission of foreign news see Östgaard, 1965.) The system is largely unidirectional so that periphery ideas have difficulty getting to the centre.

2. Another possibility lies in the differential nature of socialisation patters in different strata of society. These may operate at several levels: at one level is the enormous weight of influence that 'liberalism', 'rationalism', and 'academicism', etc., exert on each child that struggles through the education system in the production of future pillars of society. The further the individual goes, the more extreme reactions and expressions are socialised out by the prevailing mores of the educated sub-culture. It is not necessarily that the people at the centre do not have strong opinions: it is that they live in a sub-culture which makes it taboo to express opinions strongly, at least to the public opinion pollster. In other lacuna of society, if one has a strong opinion one is at liberty to express it. It is this difference which has here been referred to cognitive style.

However, as far as opinion on foreign affairs goes, such a theory leaves out the question of the opinion-holder's sphere of activity the life situation in which he acts. It has been a major lesson of contemporary psychology (especially from the work of Piaget) that cognitive development depends largely on the actions of the individual. Human beings act on the basis of a cognitive framework which they build up as a result of extensive interaction with the world around them. There is little opportunity, or necessity, to test against reality ideas from spheres of existence remote from the individual. Hence such ideas may be extreme and simple, and may fluctuate from one end of a scale to the other. Only by increasing use of them as guides to behaviour will greater logical differentiation occur and stability achieved somewhere in the middle of the extreme points. The African tribesman may make 'stupid' or 'illogical' reponses to an intelligence test, but when the (white) psychologist is placed in the African bush, he is likely to make what appear to the tribesman as stupid and 'illogical' responses.

The structure of the international system is such that relationships between nations are essentially between the centres of nations. The periphery does not act in the international system, and it is not suprising if their opinions are untested against reality and modified accordingly. What we do not know is whether the periphery or the centre are more absolutistic when dealing with basic elements in the life-sphere of the periphery.[1]

3. Then there is the possibility that due to socialisation, or other determinants of personality, there are people with different kinds of logical basis to their thinking in situations requiring social and political interaction. They use different 'programs' rather than different values for the parameters within the program. Thus, the simplest strategic situation involves two people, each with two choices which combine to give four possible outcomes. It requires two bits of information to determine which choice to make. If the number of choices or players increases, there is a rapid increase in the information processing capacity required in order to act. Only one extra player, or one extra choice each may produce a situation complex enough to approach the limits of a single human information processing channel if there is a pressure of time. To deal with a more complex situation it must be cognitively restructured by cutting down on one or more of the variables, or by formulating the problem in a hierarchical, step-by-step way. This kind of process is well known, particularly under conditions of stress, which reduces the capacity for complex information processing. Miller (1963) suggests seven major coping mechanisms, of which filtering and ommission seem to be the most utilised under conditions of medium stress. The ability to cope with a problem by polarising the alternatives within a single dimension is usually called absolutism. The ability to cope by recasting the problem into a second order problem is usually called gradualism.

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1. Kerlinger (1967, footnote, p. 119) suggests that the periphery has 'fewer referents that are criterial', referring to the finding of Cambell, et al. (1960) that the 'average person' has a poverty of attitudes. This seems to be another way of saying what we mean here.

Such structural factors may lead on to a dynamic approach to strategic thinking. Those who cannot restructure the situation are likely to react according to the immediate effects of their actions (see Cooper, 1965, 1966). Others may cope with the complexity of the situation by inventing tacit moral laws which have the effect of ruling out certain choices and reducing the need for further thought. Others may be able to restructure the situation in such a way as to be able to think effectively about it and manipulate it to their advantage. These may be referred to as cognitive modes in strategic thinking.

A simple theory would be that people towards the periphery of society were more absolutistic, more isolationistic (because they were further from international behaviour), and less co-operative in the Prisoner's Dilemma (because they had less socialisation in co-operative behaviour). If the socialisation functions of education were a major factor, we should expect only small differences in co-operative behaviour in our sample, probably unrelated to social position. If the nature of the home background were important, we should expect differences due to the father's social position. If the experiences in the life of the individual were important we should expect differences related to social position which do not affect all members of that social stratum, but apply only to those who have got out of that layer to where they are now (such as students from lower social positions).

The significance of the latter point for the present research is to be found on the first part of this chapter, where it became clear how limited were the chances of people from the periphery reaching the university and thus being included in the sample. (Lindbekk, 1967, shows this clearly in his study of research recruitment.) One might therefore expect any differences in the behaviour of those lower on the SP index to be related not to their social position per se, but to the requirements of overcoming the barriers to university entrance. This may be expected to apply particularly to women.

We noted that on the ladder ratings there were small but statistically insignificant differences between men and women. However we saw that the curve of expectations from past to future was much steeper for those with lower scores on social position, though there was a general convergence on ratings for the future. The judgements

cannot be said to absolutistic on the part of any sub-group. It is probably realistic for those at SP 3 to record a somewhat greater improvement in their situation in the previous five years, though this may not be so much a material improvement as reaching a status which matches their achievement expectations. More of the 4's than the 5's expected to be better off in the future, but they made more moderate judgements of how much better off they expected to be. The expectations for the nation seemed to follow the personal expectayions most closely in the case of the 3's. Table 5.7 shows that women had more extreme judgements than men in eight out of twelve comparisons, and that judgements were more moderate the higher up the social position scale, the difference being most marked for women.

Internationalism and knowledge of international affairs did not seem to relate to the father's social position, as shown in Table 5.6. There was a small linear decrease in the internationalism score with social position and no relation on the knowledge score. On the other hand, while there was no relation between sex and internationalism, there was a significant relationship between sex and knowledge, with the men scoring higher than the women. The one student with any extreme judgement on the question about the world situation in five and twenty years' time was at SP 3. Otherwise there were no extreme judgements, compared with 4 per cent of the national sample regarding the world situation in five years' time, and 21 per cent in twenty years' time. This suggests that the socialisation factor against extreme judgements is operating in the student sample.

There was a relationship between social position and the level of co-operation in the Prisoner's Dilemma game, but this was largely due to the sex factor. The indicators of the father's social position contributed to the correlation (gamma = 0.26 for occupation of father, 0.33 for ecology of father, with sex removed; sex of student plus education of father gave gamma = 0.55; full SP index as used here gave gamma = 0.71 with level of co-operation). Given that the subjects had all undergone an extensive and similar education process this is perhaps a remarkable result.

There was also a relationship between the level of co-operation and the ladder-ratings for the nation in five years' time (gamma = -0.63). This was also largely due to the differences between the ratings of men and women (gamma = -0.2 for men, -1.0 for women[1]). There was a correlation of 0.52 for women who were high on co-operation and low on national ratings and social position. It may be hypothesised that, in order to be university students, women who are low on dimensions of social rank must have high achievement motivation and that this is reflected in low co-operation (high competitiveness) in the Prisoner's Dilemma game. When this group of women was separated from the rest it was shown that it was not just a simple question of level of co-operativeness, but rather that the whole mode of behaviour was different (Table 5.14).

There was no simple relation between the level of co-operation and the internationalism and knowledge scales.

All this suggests that the acculturation process undergone by students does affect their verbally-expressed attitudes. But while the acculturation process acts to create homogenity at the level of cognitive <u>style</u> it does not lead to homogenity of cognitive <u>mode</u>. Indeed, for those low on social position, only those who are especially competitive may reach the university. This seems to be particularly the case for women, who must struggle in any essentially male environment in a society (either in a university or in the society at large) which does not accord them equality. Hence the reason for including sex in the social position index. For university students sex is the main discriminator of social position, so that it is not suprising if this seems to be the major factor in our data. It has not been shown that women in general are more competitive, nor that people at SP 3 are: to do so would require that we draw the appropriate samples.

5.2.8. <u>Conclusion.</u>

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1. This extreme correlation indicates that gamma coefficients must be treated with care, especially where there are zero values in any of the cells. For limitations in the use of gamma and tau see Galtung (1967).

It may be concluded that, within the considerable limitations of the exploratory design of this experiment, we have found some evidence of a parallel at the behavioural level of Galtung's findings of a relationship between social position and public opinion. Nevetheless, the relationship between social position, verbally-expressed attitudes and judgements, and behaviour is clearly complex. Upward social mobility may relate to achievement motivation and competitive behaviour, but neither may relate to expressed opinions or moderate judgements. While it is not possible to generalise from this sample to the general population, neither can centre-periphery theory extrapolate from the general trends in public opinion to the decision-making elite. They, like our sample, are a highly selected group. In order to get where they are - even those from the highest level measureable on Galtung's social position index - high-level decision-makers must have qualities of achievement motivation, competitiveness, etc., which, as in our subjects, may be reflected in their behaviour but have no relation to their verbally-expressed opinions.

6. SYNOPSIS AND PROGNOSIS: COGNITIVE MODE IN STRATEGIC THINKING

6.1. Introduction.

Consider the following statements:

"Widespread guerilla warfare and the people's anti-Japanese movement will wear out this big Japanese force, annihilating it in large numbers on the one hand, and on the other hand breaking down its spirit by enhancing the home-sickness and war weariness of the troops, as well as their anti-war sentiment." (Mao Tse-Tung, Selected Works, Vol. II, p.187.)

"He must believe in the truth and non-violence like his teacher and thus have confidence in the inner goodness in human nature which he expects to awaken by the honesty and love expressed by his leadership." (Ghandi's advice to satyagrahi. From Galtung,J. and Næss, A., Ghandis Politiske Etikk. Oslo, 1955, p.113. Author's trans. from Norwegian.)

"In the future it may be possible to place less reliance upon deterrence of retaliatory power... Thus, in contrast to the 1950 decade the nations which are around the Sino-Soviet perimeter can possess an effective defense against full-scale conventional attack and thus confront any aggressor with the choice between failing or himself initiating a nuclear war against the defending country. Thus the tables may be turned in the sense that, instead of those who are non-aggressive having to rely on all-out nuclear retaliatory power for their protection, would-be aggressors would be unable to count on a successful conventional aggression, but must themselves weigh the consequence of invoking nuclear war." (John Foster Dulles, 'Challenge and Response in US Policy Foreign Affairs, 1957.)

". . . war belongs not to the province of the arts or sciences but to that of social existence. It is a conflict of great interests which is settled by bloodshed, and only in that is it different from other conflicts. It would be better, instead of comparing it to any art, to compare it to a trade, which is also a conflict of human interests and activities; and it is much more like politics, which again, for its part, may be regarded as a kind of trade on a large scale. Furthermore - politics is the womb in which war is developed, in it its outlines lie hidden in a rudimentary state, like the qualities of living creatures in their embryos." (Von Clausewitz, On War, Infantry Journal Press, 1950.)

"To study the strategy of conflict is to take the view that most conflict situations are essentially bargaining situations... Thus strategy - in the sense in which I am using it here - is not concerned with the efficient application of force but with the exploitation of potential force." (T.C.Schelling, The Strategy of Conflict, New York: Oxford University Press, 1963. Original emphasis)

The important thing about these quotations is not only the difference in content, but the differences in the ways of thinking which they reveal. The 'strategic thinking' demonstrated in each case is of course a reflection of the very different situations in which the writers found themselves. Nevertheless, the two Asians, exponents of quite contrary philosophies and strategies, have an emphasis on the 'human' aspects of conflict which seems to be entirely lacking in the thought of the Western writers.[1] It is difficult to imagine Dulles talking of the 'anti-war sentiment' of Soviet or Chinese troops - or even of his own troops.

Each of these writers has had a tremendous influence on ways of thinking about the political and military aspects of conflicts. Yet it may be that their differences are not only based on alternative viewpoints and varying assumptions, but on different cognitive processes of strategic thought.

The conclusion of the experimental study presented earlier was that indications of differences in the mode of strategic thinking are present in in the behaviour of subjects in the Prisoner's Dilemma game. Experimental games might therefore offer a technique for the systematic investigation of the psychology of strategic thinking. This concluding chapter is devoted to a preliminary attempt to construct a comprehensible framework for the analysis of the psychology of strategic thinking.

6.2. Structure and dynamics in strategic thinking.

A strategic situation is such that the major variables built into the structure of the situation are the actors, the choices and the outcomes. These may be represented in the form of a payoff matrix. The dynamics of strategic thinking arise from several sources: (i) cognitive processes leading to a single choice in a 'one-shot'

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1. Mushakoji (1967) has conducted an interesting experimental 'conflict' involving Japanese and American students as negotiators. He found that negotiations (in a simple international simulation) were more successful where the Japanese were faced with interlocutors who were 'empathy oriented, diffuse and particularistic in style', while the Americans preferred an 'issue oriented, specific (to the problem in hand) and universalistic' (applying to all other such cases) style.

game, mainly a direct function of the payoffs, and the complexity.
(ii) Cognitive processes leading to a succession of choices in an iterated game. In this case the player if forced to consider not only the set of payoffs, but also what he thinks the other player(s) will do on the next trial is he makes a given choice this trial; and therefore what he might also do on the next trial and the one after. Not only the evaluation of the outcomes is important here but the players perceptions of each other. The pattern of choices may be regarded as a form of communication, even if no other communication is allowed, reinforcing perceptions.
(iii) If there has been prior communication (in the broad sense, and thinking now more of social situations in general) the perceptions that the actors have of each other become a primary variable. The development of person perceptions, and their effect on interaction between persons, is therefore an important aspect of the dynamics of strategic thinking.
(iv) If there is continuous communication during the 'game' (which then becomes a 'negotiable', or 'bargaining game' in the technical usage) then the content of the communication leads to the dynamic problem of its reception and interpretation by the actors. The set of categories with which each actor constructs his 'image' of the world, and the affective meaning which he attributes to them, are important in determining how he selects, codes and interprets information transmitted by another actor, and also information he transmits to another actor (who may not interpret it in the way intended by the transmittor). In real strategic situations the structure of the 'game' may change from choice to choice, so that communication becomes a means of giving a structure to the game at each point in time.

Some of these factors have received a considerable amount of research attention, others have not. It is of particular interest to the psychologist to discover what are the cognitive processes at each level, and secondly, to examine what are the differences in the processes employed by different people at different times and circumstances. Making a choice in a strategic situation involves a complex piece of 'psycho-logic', and it is not unlikely that there are several possible 'solutions' to a given problem. What are the possible solutions (psychological, not mathematical), and which people employ them on which occasions?

Let us take the problem of the complexity of strategic situations. As Rapoport (1967b) has pointed out, a two person, two-choice non-zero-sum game (giving a 4-cell matrix, each containing a payoff to each player) results in 576 permutations of the orders of preference of the players, equivalent to 78 non-equivalent games. If the number of players is increased by one, and the number of choices available to each of the three players is increased by one, making three, the number of permutations is nearly two thousand million (U.S. billion). In order to act in such situations, human beings must reduce the complexity, and they may do this in a number of ways.

Simplification of the outcomes. The complexity may be reduced considerably by assuming that the preference order of the opponent is either exactly the same, or exactly the opposite. Determining one's own order of preferences will then immediately give the other actor's (that is, subjectively: such an assumption of the other's values may bear little relation to his actual values). Some outcomes may be simply ignored (for example, that an enemy can want peace, or that one's strategy can lead to self-annihilation by nuclear war). The mirror-image effect on the one hand, and denial on the other, are well-known psychological phenomena, though it remains to demonstrate them experimentally in strategic situations.

Limiting the number of choices. In a given situation, the range of actions is limited by considerations of relevance. Nevertheless, it is not uncommon that fewer alternatives are considered than are actually possible. Possible choices, for either player, may be ignored almost arbitrarily, or because of conscious assumptions. In experimental games the number of choices is frequently two or three. In real life, the number of choices is typically much larger, but the number is psychologically limited to two or three ('escalation' or 'de-escalation', a channel tunnel or a bridge).

Limiting the number of actors. In the theory of games n-person games can be reduced to 2-person games by the formation of coalitions. There is evidence from a number of social situations that interactions between three or more parties are unstable, and strong attempts are made to reduce the number to two ('He who is not for us is against us'). This is particularly a problem for arbitrators, peace-keeping

forces and multi-party political systems. Attracting 'neutrals' to one's own side, or regarding them as opponents, reduces the need for complex thought as to how to deal with them. 'Tolerance of ambiguity' is an important psychological concept here: some individuals, particularly when they are extremely anxious, are intolerant of ambiguity and resort to psychological means to reduce it (see e.g. Stagner, 1961). Bruner and Tajfel (1961) talk of 'narrow and broad categorisers' in situations of cognitive risk and environmental change: "The narrow categoriser appears to prefer the risk of reacting and possibly being wrong. The broad categoriser prefers the risk of not reacting to change and possibly being wrong" (p.241, original emphasis). (Chapman, 1961, found that schizophrenics tended to increase their errors of over-exclusion when conceptual categories were broadened.) In a strategic situation where we must not only categorise the choices and outcomes, but also the other players, the dynamics of the inclusion of particular others into categories 'friend' or 'foe' is important in determining which choices will be made - and hence which outcomes will result.

A structural theory of strategic thinking might be developed from further experimental studies of how the factors choices for self, choices for other, set of outcomes, and set of players are cognitively simplified in strategic thinking in complex situations.

Such processes may be themselves a source of conflict, since they may enable each player to arrive at a different simplified matrix from that imagined by his opponent. Intelligence, creativity and the amount of stress experienced by the actors are likely to be important factors in determining the matrices and the consequent choices.

It might be imagined that the 'normal' person may resort to any or all

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1. Neuringer (1964) concludes after an experimental investigation that authoritarianism, ridgity and anxiety are intimately related. "When the authoritarian person is under stress, his usual rigid outlook becomes a caricature of itself . . . The heightened rigidity helps him cling more tenaciously to known anchor points that serve him as a basis for some kind of action and/or decision-making. In a sense the excessive rigidity helps maintain a semblance of cognitive organisation during the stress period."

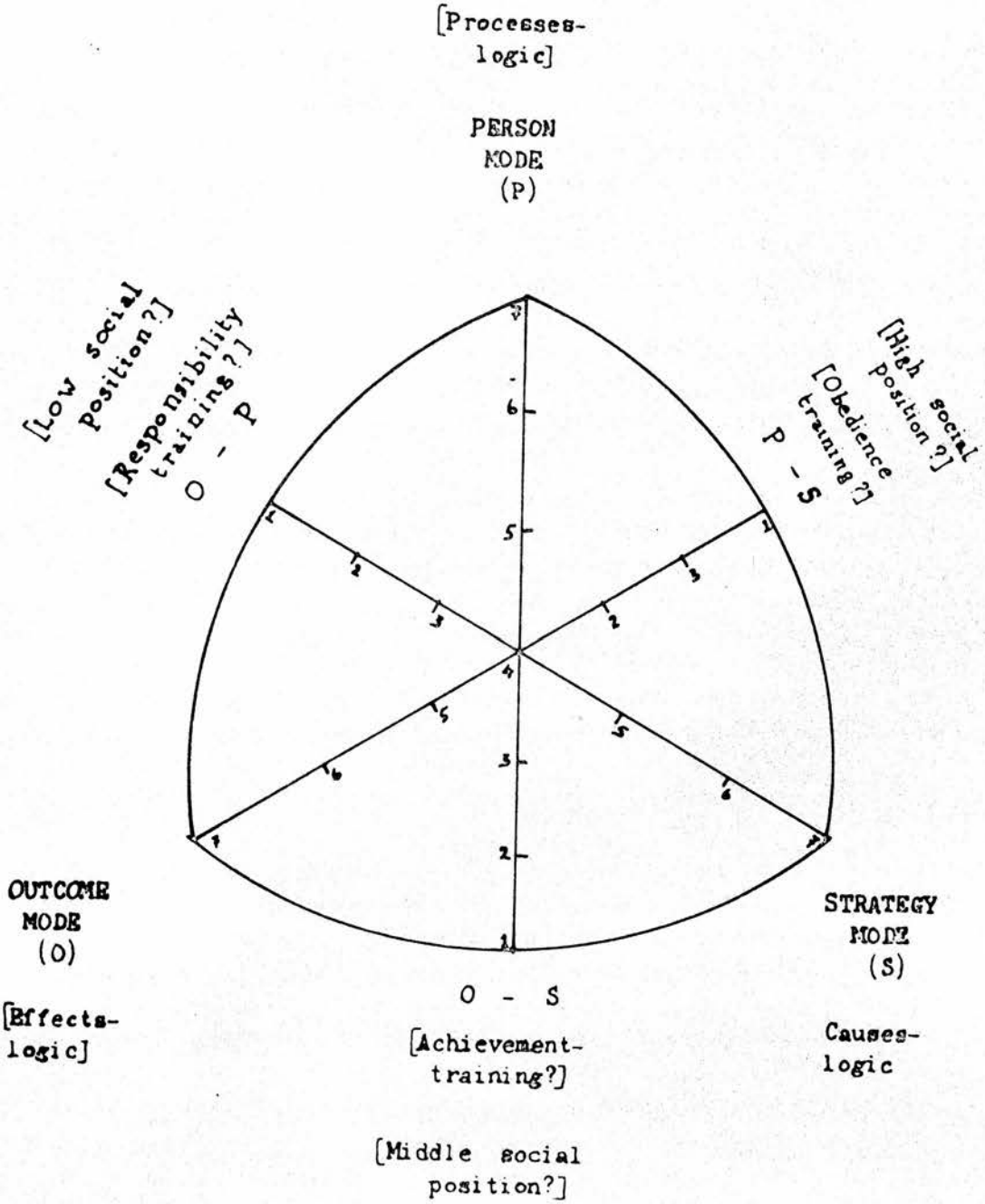
of the means of simplification, but that some people resort to one more than the others; or alternatively that some people resort to one less than the others. In this case one could concieve of a score for an individual on each of the three dimensions, people (players), choices and outcomes. Figure 6.1 uses the representational device of Sheldon to show this. Actors may be rated say 1 - 7 on each dimension, giving a score of 4.4.4. for the mean individual on each dimension, a score of say 1.6.6. for an individual low on one and high on the other two, or 7.2.2. for an individual high on one and low on the other two. (The method would require that subjects be presented with a series of complex matrices and be required to describe their strategic considerations; this, at least, seems a feasible suggestion, though it has not yet been attempted.)

A dynamic theory of strategic thinking may now be introduced. It was suggested earlier that Cooper's (1965, 1966) concepts of Effects-, Processes-, and Causes-thinking may reflect different levels of strategic thinking. In the first case, the actor considers only the immediate effects of his choices, so that if he wins he might make the same choice again, and if he loses he might change. He does not consider the other player, nor does he make recursive calculations about his own possible choices in the future. This is assumed to be the level of thought of the rat in the T-maze, and, particularly where speed of response is required, clearly has adaptive significance in pre-social situations. Cooper claims that such thinking is typical of younger children.

Secondly is the case where tacit moral 'rules' are established by one or more of the players: in the case of the Prisoner's Dilemma, for example, 'We should both make the co-operative choice because that is the right thing to do'. This stage of thought implicitly involves considering the other player, but simplifies the situation by 'presribing' choices for each. Such behaviour is appropriate to many social situations, and seems to develop in pre-adolescent children.

Thirdly, the players may be able to deal with relatively complex strategic aspects of the situation, attempting to manipulate it to their advantage, taking into account the possible choices of the opponents, and their own future choices under various eventualities.

FIGURE 6.1. Hypothetical space for plotting modes of strategic thinking.



Cooper's theory, based on a comparative study of British and Japanese children (1965) and interviews with British politicians (1966), is that these represent Piaget-type developmental stages in cognition - but that in the adult the primary stages may be 'recapitulated' in particular situations. For example, some Members of Parliament might be in favour of unilateral nuclear disarmament because of fear or disgust of the consequences of using nuclear weapons; others because they believe it to be morally right to give up nuclear weapons and if 'we give them up others will feel morally bound to do so too' (and if they don't we can at least feel virtuous); and others because of strategic calculations about effects on the 'balance of power', in order to get into the Common Market, in order to invest the resources in more constructive projects, or to weaken Britain's role in NATO.[1]

A psychodynamic theory of strategic thinking is suggested by the work of cultural antropologists (Roberts, et al. 1963). The work of McClelland and his colleagues (e.g. 1955) on achievement motivation suggested a relationship between independence training in childhood and later achievement orientation. Moss and Kagan (1961) found significant correlations between childhood and adulthood achievement behaviour. Maternal acceleration of the child's developmental skills during the first three years of life predicted adult achievement behaviour for women but not for men. (Other work of McClelland suggests that the presence of the father may be an important factor in diminishing the achievement behaviour of the males (McClelland, et al. 1953.)) McClelland (1961) has then tried to use the wide cultural differences in achievement motivation as an explanatory principle for differences in economic development.

The importance of Roberts' work in the present connection is that his studies of games and folk-tales in a wide range of cultures indicate that achievement-training is associated with games of

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1. Hveem (1968) has recently completed a study of the Norwegian 'foreign policy elite' (a sample of MPs, Foreign Department, mass media and interest organisation representatives) which gives some indications of such cognitive processes. Of particular interest in Hveem's study is how the short the time perspective seems to be amongst such decision-makers, and how little imagination they have for change from well-trodden paths of thought.

physical skill (and folk heroes who win over their enemies by their strength and prowess in battle). A cultural emphasis on games of chance seems to be associated with responsibility-training in childhood (i.e. the games seem to be a kind of compensation, where responsibility is not possible). Games of strategy are are only associated with obedience-training. This relationship holds both cross-culturally, and within American culture (Sutton-Smith, et al., 1963). Previous studies of the same group of researchers have shown that these three major divisions of games have specific associations with child-rearing practices. (Roberts et al., 1959; Roberts et al., 1962). But in the 1963 article they point out that games of strategy are associated with high political integration and high social stratification. They propose a psychodynamic explanation: "Obedience training . . . produces psychological conflicts which heighten drive and curiosity within this area and these in turn are assuaged by play with model social systems, i.e. games of strategy. In addition the play with the models teaches the player such appropriate skills as the discernment and foresight he will need if he is to function later as a commander, obeyer or decision-maker." (p.189) Referring to Piaget (1932) they add: "Perhaps it can be said that individuals must reach certain advanced levels of social and intellectual maturation before they can appreciate the strategic mode in models". (p.197).[1]

These findings suggest not only the development of several stages of strategic thinking within individuals but within societies. In a stratified society (particularly in a complex, modern society) differences may be expected in various sections of the community for two reasons: (i) the patterns of family relations may vary, influencing development along the lines indicated above; (ii) the social situation will be different, resulting in differences in approach to the problems of the society. Thus Crowne (1966) reports that subjects from entrepreneurial families were considera-

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1. It is interesting to note that the Western strategists seem to originate in 'Prussian' or German and Russian Jewish families, the Eastern strategists from Chinese or Vietnamese families - in each case strongly paternalistic. (Kahn, Kissinger, Schelling, Wohlstetter vs. Mao Tse-Tung, Lin Piao, Vo Nguyen Giap, etc.)

bly more exploitative than those from bureaucratic families. 'Entrepreneurial' females were more competitive than 'entrepreneurial' males, a sex difference which did not appear among the bureaucrats. Mischel (1961) found the ability to delay gratification related to need for achievement and social responsibility in 11-14 year old Trinidadian children. Several writers have pointed to social class differences in cognitive constructs (e.g. Bernstein, 1961; Warren, 1966).

Clearly such differences are a reflection of the social situation and the resulting concerns of the individual. At the extreme, the demand for immediate gratification (effects-thinking, or a concern for outcomes) may be overiding, making social behaviour impossible (as in the hungry baby). Keys et al. (1950) reporting on the World War II Minnesota starvation studies point out that the individual may withdraw into a 'life of his own, withdraws from society, withdraws from any significant activity unrelated to staying alive'. Zawadzki and Lazarsfeld (1935) showed how a pre-occupation with physical survival, even in industrial areas, is a force militating against community ties and the possibility of joint action. Davies (1962) adds that "Far from making people into revolutionaries, enduring poverty makes for concern with one's solitary self or solitary family at best, and resignation or mute despair at worst . . . A revolutionary state of mind requires the continued, even habitual but dynamic expectation of greater opportunity to satisfy basic needs . . . But the necessary additional ingredient is a persistent, unrelenting threat to the satisfaction of these needs". (p.8).

Social relations, identification with the group around, initial conceptions of moral rules (e.g. Strauss, 1954), possibilities for interpersonal attraction and affiliation (e.g. Byrne, 1961), conformity (e.g. Zajonc & Kishorwashi, 1961), exploitation, competition and co-operation, can only arise when the individual and society cease to be dependent on the immediate requirements of basic needs for survival. Concepts of codes of behaviour arise, at first related to behaviour in a given situation, later generalised and made more abstract and extensive (Piaget, 1932; Strauss, 1954). Piaget suggested that there may first develop a 'morality of constraint', which may later shift to a 'morality of co-operation'. (In the experi-

mental games employed earlier this should create a more co-operative response where the 'punishment' for joint non-co-operation was increased (the DD outcome), and decreased co-operation for decreased punishment, in the case of subjects acting according to a morality of constraint, but not in the case of subjects acting according to a morality of co-operation, where the CC outcome remained the same, or even if it was changed.) Sherwood (1966) reports data which seem to indicate that the morality of constraint of the young child characterises the moral judgements and attitudes toward punishment of the authoritarian adult. Thus there is a direct link here with the studies of the effects of authoritarianism and social rigidity on behaviour in experimental games mentioned earlier (Chapter 1).

On the other hand, the ability to establish elementary social relations enables a 'need for affiliation' to be expressed. Some people may not be interested in which game they play, or who wins, but in who they play the game with. The social phenomenon of the bridge club is an excellent example - a game of strategy which may be played as an exscusefor establishing social relations. In which case other factors affecting interpersonal attraction, such as attitude similarity, become important in maintaining the club, and may be much more important for those high on n-affiliation (Byrne, 1961). Those high on achievement motivation (which might be another reason for joining a bridge club) will conform to the group norms as long as it is necessary for achievement, but not otherwise (Zajonc & Kishorwashi, 1961), so that a bridge club made up only of high-achievers might be less likely to continue as a stable institution. Though as indicated earlier, games of strategy like bridge, may not be sufficiently motivating for the high-achiever to want to join a club; he might join it in order to make the right social contacts to advance his position. Other people play bridge or chess because they are fascinated by the strategic thinking involved, the challenge of outwitting another good player, etc. Again this depends on the establishment of elementary social relations and is not possible in extremes of deprivation. In addition it seems to require a fairly high degree of intellectual maturity, be associated with obedience training in childhood, and arise in politically complex, stratified societies.

Faced with with what have here been described as strategic situations, it might be suggested that some people are interested in who they play the game with (person-oriented); some people are interested in who wins (outcome-oriented); others are interested in which strategies to choose to out-wit the other player (strategy-oriented), and are not especially interested in the stakes per se, nor do they mind who they play the game with as long at it is someone who will give them a 'good game'. Again these may be represented as three dimensions, as in Figure 6.1.

These dimensions seem to be similar to Cooper's P-logic, E-logic and C-logic, yet not quite. Outcome-orientation suggests Effects-thinking; Strategy-orientation suggests Causes- thinking. Processes-thinking implies employing tacit 'moral' laws (though I find terms causes and processes insufficiently appropriate). If there is a close relation between moral laws and affiliation and identification with others, as seems not unlikely, then person-orientation may be the same thing as P-logic.

The large number of studies employing game-theoretic situations have demonstrated that the assumptions of game theory enable rather little prediction of the choices of real subjects, and that the pattern of these choices varies according to the subjects selected. It is usual to analyse the behaviour in terms of the statistical relations of the response patterns. These response patterns may be taken to reflect the strategic thinking of the subjects, and it was argued earlier on the basis of the present experimental results that subjects show different modes of strategic thinking. It may now be suggested that Outcome-mode, Person-mode and Strategy-mode are the fundamental cognitive processes involved. These modes are not imagined as mutually exclusive but as concentrations on particular aspects of the strategic situation. They may be regarded as learned as a result of social interactions in the previous experience of the individual, where P-mode and S-mode are more complex than O-mode. Just as Piaget did not suggest that the moral responsibility of the child developed through a precise set of stages, as in intellectual development, so it not suggested here that there is a generalised progress from one stage to the other, with the adult employing the most advanced mode in all situations. On the other hand, the young child is unlikely to able to use S-mode in any interaction.

There is somewhat more significance to this theory than may at first appear. The logic of the Prisoner's Dilemma is that unless psychological judgements are made about the other player game-theoretic rationality leads to the absurd result of mutual loss in the face of possible mutual gain. Two game theoreticians will presumeably continue to make the D choice, on the basis of their calculations of the dominating strategies, an example of pure Strategy-mode. But a player who can also think in Person-mode, and is not too subject to Outcome-mode, can begin to consider the choices of the other player, and, for example, try to lure him into making the C choice, only later to face the strategic defection of the first player. Alternatively, a player can, if he adds P-mode to S-mode, try to communicate by his pattern of responses that he is prepared to come to a tacit agreement on the CC outcome. A player employing the pure P-mode will note that both he and the other player can be better off if they choose C ('morality of co-operation'), but not be able to think sufficiently strategically to deal with an opponent who treats him as sucker. If he continues to lose by playing C, the tendency to choose D, both in the hope of winning back something, and to punish the other player ('the morality of constraint'), will increase. For such a person, continued defection by the other player may lead to emotional distress ('How can he do this to me?'), mixed with conflict over whether to defect himself or not. Punishing the other player may provide primitive satisfaction, but it may result in guilt since it means breaking the self-established 'moral code'. The psychological conflict produced by this complex of emotions may result in withdrawal, 'aggression' (expressed either in the pattern of responses, or, for example, in the perceptual ratings (Chapter 4) of the opponent), or considerable anxiety. The anxiety, 'blind' aggression and withdrawal, in their different ways, will each hinder strategic thinking.

The extreme Outcome-thinker will also have problems in dealing with a more sophisticated player. He will probably choose D, and if he wins he'll choose it again. If he loses, he may try C, but then may lose even more. Faced with such a 'double-bind', he will probably choose D, the lesser of the two evils, which also gives the possibility of winning more if the other player chooses C. If he wins when choosing C, he may try it again, but will also notice that he could then just as well win the larger sum by choosing D.

Outcome-mode may be mixed with Person-mode to produce the subject who says about DD, 'Well, at least this is bad for him too'. With a greater degree of P-mode a player could think, ' Since we are both in the same boat, perhaps we could change from the DD 'boat' to the CC 'boat''. The difficulty may be to persuade the other player to do so. If A fails by a simple change to the C choice, he may revert to the D choice, or resort to random choices.

Outcome-code may also be mixed with Strategy-mode. Here the player tries out strategies to achieve his best outcome, mixing his choices, randomising, luring and defecting - but all without taking sufficiently into account what the other player is trying to do. The response patterns are not seen as a means of communication. Attempts at attaining mutual co-operation by the other player are not perceived, or are seen as signs of weakness, or as proof that A's strategy is successful.

Finally, all three modes may be mixed. Such a player is able to think strategically)S-mode) about how to make the best of the situation (O-mode), <u>given that the freedom of action of another player makes constraints on his own behaviour (P-mode).</u> This, rather than the pure S-mode, may be seen as the ideal, since it is necessitated by the existential nature of strategic social relations, as demonstrated by the Prisoner's Dilemma (Lumsden, 1964).

<u>Games of chance</u> are marked by the absence of P-mode and S-mode. In a game of chance, no-one is 'responsible' for the outcome, yet it is the outcome which is important. The relation to responsibility-training thus suggests that this kind of game is compensation for behaviour normally expected, or an institutionalised regression to the stage where one did not need to be responsible because somebody else was being responsible for one (e.g elder siblings, parents, etc.).

<u>Games of physical skill</u> provide ways of ahcieving an outcome by one's own efforts. In their pure form they do not involve strategic thinking, though they often involve other players as standards of measurement. They typically have graded results (times, goals, numbers of wins, etc.) which, more than in games of skill and strategy, enable the degree of achievement to be ascertained. In the game of chance, the interest is not so much in who wins, but in how <u>much</u>.

Although the value of the prize may be measureable, its value reflects nothing back to the winner: he was just lucky. In the game of physical skill, the prize itself may not be very valuable. But the honour, which is a measure of the achievement, is reflected directly back on the winner. The interest is in who wins, but also in who he wins against: there is no honour or achievement in beating a bad player. In the game of skill, the other player acts more as a stimulus than as a constraint (as may be the case in a game of strategy). In society, the high-achiever may be restricted in his pursuit of achievement by others; the game of skill may also be an outlet therefore, where achievement is encouraged. Indeed, the game may be taken so seriously as to provide a means for the under-privileged to gain recognition in society (football in Brazil, boxing and athletics for the American Negro).

It is interesting to note that considerations of strategy seem to be coming more and more into games of skill, particularly in the case of football. This may be a reflection of the requirements of the game, since it involves complex interactions between the players, in contrast to many athletic sports. But it may also be related to changes in modern society, where the high-achiever has to think strategically.

The pure game of strategy provides an opportunity to indulge in pure S-mode. The games have complex rules, but within this framework there are none of the restrictions of everyday social relations, no requirement for a 'morality of constraint' or a 'morality of co-operation'. Bluff and double-bluff, false trails, etc., are all part of the game. There is no place for O-mode and P-mode: the 'fun of the game' is to outwit another clever, pure strategist.

All the classes of games are therefore models of competitive situations, where the outcome is determined by chance, physical prowess and strategic skill respectively. As social phenomena they may perhaps be regarded as directly reflecting basic aspects of a culture, or alternatively as mirror-image reflections, providing compensatory outlets for behaviour which is not normally sanctioned. The mirror-image hypothesis may be the better explanation. For none of the classes of games allow opportunity for P-mode which is essential

for social relations in anything other than a purely competitive, Darwinian society. P-mode involves recognising the personality of the other player, attempts to communicate, social contact, trust and tacit agreements and the establishment of norms of behaviour. The human dilemma is that we can never know exactly how the other person will react, or how he will interpret our behaviour or attempts at communication. The greater the social and cultural distance, the greater this problem is. For this reason pure P-mode is insufficient since the dilemma necessitates some degree of S-mode. But neither is pure S-mode adequate, as it requires assumptions about the nature of the other player which may be invalid, and can only be checked by establishing social contact and accepting the personality of the other player.

Thus attempts to regard war as a game of chance, a game of physical or technical skill, or a game of strategy are all false. If a situation is strategic (that is, it involves other actors, and not only outcomes and strategies, as in games against nature), then the nature of the other players must be taken into account. Their actions cannot be predicted entirely from a consideration of the outcomes and the choices except in special cases, such as zero-sum games with known payoffs, no-conflict non-zero-sum games, etc. To apply pure S-mode in social, political and international relations it must be shown that the situation is either not strategic, or fits one of these special cases.

The three modes of strategic thinking - Outcome-mode, Person-mode and Strategy-mode - (which may be pure or mixed) may each be appropriate to particular situations, but in most social situations a mixture involving all three is required. These modes may result from the attempt to cognitively simplify the structure of the matrix describing the strategic situation along one or other dimension. They may also result from long-term social learning processes in the life of the individual, and so may reflect cultural patterns.

6.3. Approaches to the measurement of strategic thinking.

In the previous section, ideas from several areas of research were brought together to produce the outlines of a potential theory of strategic thinking. Having done so (the point at which the philosopher might stop), it is incumbent upon the empirical reseaacher to show the existence of the variables, measure them, and demonstrate the nature of their relationships. Since this is the last chapter of a thesis rather than the first, such a task cannot be achieved here. Nevertheless, some possible methods will be indicated. Some of these have already been initiated; it is hoped that subsequently they may all be thoroughly investigated.

An analysis of the psychological basis of strategic must, by the nature of the topic, involve complex, multivariate research. A great many areas of psychology are involved, and their extension to social and political aspects brings in other disciplines too. The suggestions below may seem more than enough for a few researchers to handle, yet inadequate to the task. The hope is that a start can be made, and at least the possibility of further fuuitful work on the subject demonstrated.

6.3.1. Experimental studies.

A number of experimental studies immediately suggest themselves.

(i) A major aspect of the theory was that subjects must reduce the complexity of the strategic situation. A considerable amount of work has been done on human information processing which can be brought in here. The obvious experiment is to compare the performance of players in games of different complexity. This can be increased by:

1. Giving the player more choices, increasing the number of strategies available to him;

2. Increasing the opponent's possible choices, thus increasing the number of possible outcomes for the player without increasing the number of choices available (though it does increase the number of strategies, since these are regarded as the pattern of choices <u>contingent</u> on the choices of the other player);

3. Increasing the number of players, and the possibilities for communication.

There are a number of technical problems which it cannot be claimed have been overcome. Increasing the complexity of the game increases the problem of a complete strategic (game-theoretic) analysis, and hence of relating the subjects's behaviour to particular logico-strategic aspects of the situation. Secondly, choice reaction-time is usually taken as a measure of information-processing time. But in iterated non-zero-sum games of the Prisoner's Dilemma type the same game is repeated many times, often inter-trial periods being regular intervals determined by the experimenter. Information processing may continue duirng the entire iter-trial period. This might be avoided by interchanging four or five matrices, on a random basis, presenting them to the subjects as slide projections requiring a reaction as soon as possible, the reaction time being from the start of the viewing time. This is technically possible, but the effect on behaviour in simple games needs to be examined first.

Thirdly, is the more interesting theoretical problem as to how to distinguish between the modes of strategic thinking, if they exist. Table 5.12 showed that two groups of women could be distinguished on the basis of the conditional probabilities of choosing co-operation after each of the four possible outcomes in the Prisoner's Dilemma. The low-C group responded most to the DD outcome, the high-C group most to the CC outcome. The figures for the men (presented in Chapter 2) fall in between, but are more like the latter group. These patterns seem to illustrate a Piaget-type 'morality of constraint' on the one hand and a 'morality of co-operation' on the other: in our terms, Outcome-mode and Person-mode respectively. But the S-thinker, playing against someone who is trying to co-operate, might also be low in co-operation. Two solutions seem to be available. The first is to compare behaviour in several games, against different players, to see which aspects of the situation the players are consistently reacting to. The other is to use intensive and systematic questioning of the subjects as to how their decisions were made.

(ii) Standard experiments could be carried out using subjects representing groups selected on the basis of a number of criteria. One such group might the members of a bridge or chess club. Is it possible to distinguish the behaviour of such a group from 'normals' in the Prisoner's Dilemma? If so, in what way is their behaviour distinguished?

How does their behaviour differ, for example, from that of football-players and social workers? Other criteria for comparing selected groups are suggested below (6.3.2, 6.3.3).

(iii) As discussed in Chapter 5, the sources of the differences between men and women in their behaviour in the PD game are not yet clear. We should mainly imagine that they are due to differences in mode of strategic thinking, which is one of the things we should hope to determine by further research. But it was also suggested earlier that the difference may be due status differences. An experiment designed to test this hypothesis has been designed, where men will play men, and also men who they imagine to be women, and vice versa for women. In addition high-school students will play university students, and perhaps university students will play university staff. The hypothesis is that like-status pairs will be more co-operative than unlike status pairs.

6.3.2 Psychological testing.

> "When a person has a problem or worry it is best for him not to think about it but to keep busy with more cheerful things."
>
> "Wars and social troubles may someday be ended by an earthquake or flood that will destroy the whole world."
>
> "In times like these a person must be pretty selfish if he considers primarily his own happiness."
>
> "My blood boils over whenever a person stubbornly refuses to admit he is wrong."
>
> "There is usually only one best way to solve most problems."
>
> "I prefer to stop and think before I act even on trifling matters."

The first two statements above, which seem to indicate extremes of Outcome-mode, are taken from the California F-scale, renowned as a measure of authoritarianism. The next two, which indicate a concentration on the negative side of Person-mode, are from the Rokeach Dogmatism scale. The last two, which suggest Strategy-mode, are from the Gough-Stanford rigidity scale. The items are exceptions in that they are relatively 'pure', but many of the others give a strong impression of trying to 'catch' mixed modes, the first two tests concentrating (in a very negative way) on Outcome and Person-modes, the third test (also in a negative

direction) on Strategy-mode. A number of the items have been chosen from each test, and some additional ones added, giving a preliminary scale of fifty items. It is hoped to use these as a basis for deriving a scale of Mode of Strategic Thinking (MST). After pilot testing, modification of the items and some pruning, they will be tried out on some broad samples and the results submitted to factor analysis. Given that there are signs of simple structure, correlations will then be attempted with other measures (social position, sex, behaviour in experimental games, etc.), and the scales below.

A second scale - the Activities Scale - lists twenty-five common activities, and the respondent is asked to list in rank order his top five preferences, and the top five preferences of his countrymen. This activities can be broadly classified into those involving physical skill or pleasure, chance, strategy, personal contacts; and mixtures of two such aspects (e.g. dancing).

A third scale - the Human Relations Scale - presents multiple-choice answers to a number of questions on human and sexual relations. A fourth scale, the Family Scale, asks for an order of preference first on the question of who is the most important member of the family, and then a set of alternative aims in bringing up children. This scale emphasises achievement, responsibility and obedience training. The Human Relations Scale presents alternative Outcome, Person and Strategic approaches to friendship and sexual relations.

These scales are in the first stages of development only and so will not be presented here. Much work is required before it can be determined whether they have any value. The ideal, however, is to produce a relatively simple and easily administered set of tests which correlate highly with particular patterns of behaviour in strategic situations. The tests can then be more readily and widely used than can experiments as measures of strategic thinking.

6.3.3. Developmental, social and cross-cultural studies.

One of the assumptions of the theory is that the behavioural differences observed in experimental games are the result of social learning. It might therefore be hoped that the development of such differences could be followed through several age-groups in several social groups. It may then be possible to determine to what extent the differences are due to differences in social and intellectual development, and to what extent 'sub-cultural' factors, such as child-parent relations, socialisation to competition and co-operation, etc. Sex differences in behaviour in Prisoner's Dilemma-type games could also be explored in the 'Piaget-sociological' manner. Do differences appear in only certain types of family and social background? If so, at what age do these differences appear? A number of studies have used children as subjects, but the ages and social backgrounds have not been, as yet, systematically varied. It was suggested in Chapter 5 that women students from a lower social position who are more competitive in the PD game may be so not because they are women, or because they are from lower social position per se, but because they have had to be more competitive inorder to get to the university from that lower social position. Whether or not they are such a specially selected group of women, or of people from lower social position, could be determined by studies employing more representative samples of women and social positions.

If there are social differences, there will probably also be cultural and national differences in strategic thinking, which may be of great significance. Cantril's studies of hopes and fears, McClelland's studies of achievement motivation, Osgood's studies of semantic meaning, and Mushkoji's (1967) study of differences in bargaining procedure in a small simulation, all point to the importance of cultural variables. If we can identify modes of strategic thinking, then we can hope to measure their distribution in different cultures. There will, however, be considerable methodological problems in transferring the measurement techniques from one culture to another, particularly in the case of the kind of tests described above. Experimental methods may therefore be preferable.

The findings in Chapter 4 suggested that possibility that people are evaluated on different dimensions in different cultures. If this proves to be the case, then it is not unlikely that there will be systematic relationships with the predominant modes of strategic thinking employed in the culture. OS-cultures (Outcome and Strategy modes) might be expected to emphasise power dimensions in their perceptions of people; PS-cultures might emphasise empathy, morality, honesty, integrity, etc.; OP-cultures kindness, pleasantness,moral virtue, etc.

6.3.4. Strategic studies.

Strategic studies is here used in the more usual way to refer to studies of political and military strategic problems. If the quotations at the beginning of the chapter are now referred to it will be seen that the first two (Mao and Gandhi) seem to illustrate PS (mixed Person and Strategy-modes) and P modes respectively. The third quotation (Dulles) shows OS thinking, and the fourth (von Clausewitz) pure S-mode. These quotations are purely illustrative, and are in no way 'sampled' from the writings of the authors concerned.

Nevertheless, it would be technically possible to make representative samples of the writings of political and military writers, making a content analysis coded for indications of the various modes of strategic thinking. At this stage, however, a dictionary of words or phrases acting as tags for a computerised content analysis might be premature. Strategic analysis requires study of the logical connections between the 'tags', but, with modern developments in computerised linguistic analysis, it is quite likely that this will be possible in the near future. The quotations above suggest that even a simple analysis, adding up the references to the actors, outcomes and choices, would produce some interesting and significant differences.

6.3.5. The multivariate analysis.

In the foregoing a number of research approaches have been outlined. Yet none of them could be fully satisfactory alone. None of the individual measures can be expected to tap pure dimensions of the kind discussed, even if they should exist as separate dimensions. For the very nature of the strategic situation, as has been emphasised in this disseration, is that not only goals and paths to the goals are involved but also players. A complete emphasis on only one of these factors is doomed to failure in the majority of social situations. Therefore one can presume that any normal person, functioning in day-to-day social interactions, has considerable training in handling all the aspects of the strategic situation. Nevertheless, the suggestion is that some persons do not fully cope with all the factors, and this affects their performance in experimental games, on certain psychological tests (authoritarianism, rigidity, Machiavelliansim, etc.), in social relations and in strategic decision-making.

The single variable experiment of classical physics has proved of limited utility in psychology (and even in physics). What must concern us is the attempt to determine the multiple conditions for the behaviour we observe in an experiment, or the verbal response we record on a test, questionnaire or interview. In order to simplify for ourselves the relations of conditions to behaviour we construct models and theories which we hope have predictive value.

The subject matter of strategic thinking is essentially multivariate, and therefore the methods of study outlined above are seen as complementary means of investigating the possible relationships of underlying variables. With the development of modern techniques of factor analysis, multivariate analysis of variance, discriminant analysis, canonical correlation, etc., and the computers which enable years of calculating work to be done in minutes, it is possible to conceive of employing a variety of techniques, each of which may be expected to be partially measuring the underlying variable. This is the only approach possible in the study of the psychology of strategic thinking.

6.4. Conclusion.

Interest in strategy is as old as the oldest military-based civilisations, but the systematic study of the cognitive processes involved is a recent development. The theory of games of strategy and its extensions, and the growing body of experi-, mental studies, combined with a number of other contemporary theories of psychology and social behaviour, make this one of most dynamic 'forward areas' of present social science research.

The present analysis has been conducted at two levels, which it is hoped are not too incompatible. On the one hand, it is believed that 'strategic thinking' represents an important area of psychology, which has not been adequately considered by psychologists. Because of the theoretical and technical developments I believe the area can be 'opened up' to psychologists, and integrated with the body of psychological knowledge. At some points it may indeed have important implications for psychological theory. An example is that of operant conditioning and behaviour therapy. To the animal in the Skinner box, no actor can be discovered as causing the stimulus: the situation may be regarded as a game against nature, as far as the animal is concerned. The well-proven principles of reinforcement may be employed in the human situation only to the extent that they are games against nature - such as many kinds of skill-learning, removal of undesirable habits, etc. Where the human being is in some kind of strategic relationship, as with a therapist or experimenter, the nature of the 'game' must be determined before conditioning techniques can be freely applied. (For some examples of human 'games' see Berne, 1967.)

The other level is that of a psychologist trying to apply psychological methods and theories to problems of interest to researchers in a number of other disciplines. The reason for this is the common endeavour to throw light on problems of human conflict by means of social science techniques. The interchange with other disciplines is extremely stimulating, though perhaps the result appears on occasion to be something of a kaleidoscope. Rather than pick out one or two pieces, an attempt to construct some kind of pattern has been made here, mainly for the author's en-

couragement, but also in the hope of making some sense to a number of other readers, some of them psychologists, some political scientists and some sociologists. At a time when a number of psychologists have taken up an interest in international problems, so have political scientists involved themselves in experimental studies of decision-making processes and the measurement of perceptual variables in diplomatic communications. There is a flood of recent interdisciplinary books on international behaviour, and a rapid growth of research institutions. In this thesis I have therefore also tried to mark out an area in which I might hope to accomplish further substantive research 'keeping in the swim, without getting lost in the flood'.

The area chosen is that of strategic thinking and data was obtained from an experimental study, using Norwegian student subjects in a series of iterated non-zero-sum games, and from a field study of the conflict in Cyprus. A emphasis was placed on the necessity to measure the values that the participants have for the outcomes available, and their perceptions of each other. How we perceive a person may be important in determining our behaviour towards him, but this has not been considered in the theory of games, the basis of many studies of strategic thinking. The ladder-ratings of Cantril's Self-Anchoring Striving Scale were used as a measure of utility, and the Semantic Differential as a measure of person perception. The results of the latter suggest that there is a strong interaction between subjects, scales and object-persons, and further research is required before the dimensions of Evaluation, Potency and Activity can be freely assumed in studies of person perception.

The relation between attitudes, behaviour and social background is of interest to many, and the experimental study here indicated a relation between social background and behaviour but not attitudes. The behaviour seemed to indicate differences in the mode of strategic thinking, and this was distinguised from cognitive style in expressing attitudes.

Differences in cognitive mode are potentially important and a number of studies indicate ways in which they might develop. The separate studies may be given some coherence by analysing them in terms of the basic elements of the strategic situation - actors, choices and outcomes - which may be the origin of three modes of strategic thinking. A number of research approaches to the further study of strategic thinking seem to be available.

APPENDIX.

Instructions for the experiments.

"We would like you to perform some decision-making tasks. On each occasion you are asked to choose one of only two possible choices. You may indicate your decision either by not pressing the switch, or by pressing the switch. (In the latter case an indicator lamp will light up on your onw panel, the other subject's panel and the experimenter's panel.)

There are two of you, A and B, and you may both choose either to put your light off or on on each occasion. You will know which the other person has chosen from his indicator light, and he will know which you have chosen. Thus on each occasion you may make the same choice as each other, or different ones. There are therefore four possible outcomes:

A off, B off
A off, B on
A on, B off
A on, B on,

as in the following diagram:

		B's choices: Off	B's choices: On
A's choices	Off	Off, Off	Off, On
	On	On, Off	On, On

In the diagram, A's choice is the first one in each 'window', B's is the second. You will gain or lose a certain amount of money according to which of the four 'windows' results from your decisions.

There are four separate experiments: the Red, Blue, Yellow and Green problems.

NOW TURN TO THE FIRST EXPERIMENT, OVER THE PAGE.

(Prisoner's Dilemma.)

THE RED PROBLEM.

If you press the switch and the other subject does not, you will gain 10 öre and he (or she) will lose 10 öre.

If he (or she) presses the switch and you do not, he (or she) will gain 10 öre and you will lose 10 öre.

If neither of you press the switch you will both gain 5 öre.

If both of you press the switch you will both lose 5 öre.

		B's choices	
		Off	On
A's choices	Off	5, 5	-10, 10
	On	10, -10	-5, -5

A'S PAYOFF IS THE FIRST OF THE PAIR IN EACH SQUARE, B'S IS THE SECOND.

The problem will be repeated many times, and on each occasion you may make which ever choice you think best. Every 10 seconds the experimenter's light will flash and you are asked to make your decision immediately afterwards by pressing or not pressing your switch. The outcome is indicated by which lights are on or off 3 seconds after the experimenter's light stops flashing.

You may keep a record of each outcome on the sheet of paper provided, so that you can keep an account of your gains and losses (and of the person's, if you wish, so that you know how much he (or she) is gaining and losing.

(Chicken.)

THE BLUE PROBLEM.

If you press the switch and the subject does not, you will gain 10 öre and he will lose 10 öre.

If he presses the switch and you do not, he will gain 10 öre and you will lose 10 öre.

If neither of you press the switch you will both gain 5 öre.

If both press the switch you will both lose 50 öre.

		B'S choices	
		Off	On
A's choices.	Off	5, 5	-10, 10
	On	10, -10	-50, -50

A'S PAYOFF IS THE FIRST OF THE PAIR IN EACH SQUARE.

The problem will be repeated many times, so to save time we shall do it very very quickly. Every 10 seconds you are asked to make a choice and record the outcome on the sheet of paper provided.

(Resistance.)

THE YELLOW PROBLEM.

Your country is occupied by an enemy power and you are the leaders of two ideologically different resistance groups, A and B. While you both hope to defeat the enemy, you are also fighting to prevent the ideological domination of the country by the other group after the war.

You have both been arrested and are in separate cells of the prison where you cannot communicate with each other or with anyone else. Both of you know of the other's activities in the resistance. The occupying power has offered you a choice - either to talk about the other's activities - indicated by putting the switch to ON to call the jailer - or not to say anything - shown by leaving the switch OFF.

1. If you give evidence and he does not, he will be shot and his resistance group destroyed, while you will be set free, though your movements will be watched. You will have a good chance of joining in the continuing work of your resistance group, which will certainly then gain power after the war.

2. If you keep quiet while he gives evidence against you, you will be shot and your group destroyed, leaving your country open to ideological domination after the war, and he will go free.

3. If neither of you say anything, you will both be kept in prison under interrogation, and perhaps torture. On the other hand you life will be saved and the resistance may be able to continue operating against the enemy.

4. If both of you talk, you will both be sent to a prison camp. Your lives will be saved, but both resistance groups will be in danger.

Turn to the Ladder Rating Score Sheet. Imagine that the top rung of the ladder 4 is the best possible situation for your own personal life. Then:

Put an 'M' on the rung where you think 1 above should be.
Put an 'N' where you think 2 should be.

(Resistance, contd.)

Put a 'P' where you think 3 should be.
Put a 'Q' where you think 4 should be.

Then fill in these figures in Matrix 4 on the sheet provided to help you make your decision. The problem will be repeated many times as if you had to make the decision for many members of the resistance each time they came into the hands of the enemy over a period of years.

(Cuba.)

THE GREEN PROBLEM.

The world is divided into two powerful military alliances, A and B, each equipped with nuclear weapons and delivery systems capable of completely destroying the other many times over. You represent the final decision-makers of each side.

Because of military and political moves made in recent weeks there is now a state of crisis in which both sides have threatened to initiate serious military operations if the other side does not back down when an ultimatum expires. Both sides fear that the other side will make a nuclear attack, and the only way to avoid this may be to make a pre-emptive attack with nuclear missiles.

At the moment that the ultimatum expires each of you has two choices. You may either carry out your threat to initiate military action, knowing that this will almost certainly lead to a direct conflict; or you may hold back in the hope that the other side will also hold back, so that nuclear war can be avoided and perhaps a compromise achieved. However, beacause of the time taken to communicate between the two capitals, there is no possibility of communication with the other side between now and when the ultimatum expires. You must both make your decisions independently , without being able to consult the other.

(Cuba, contd.)

Now turn to the ladder-rating Score Sheet, and mark on ladder 3 the values you give to the four possible outcomes of this situation.

1. If you initiate military action, as you have said you would in the ultimatum, by putting the switch ON, and other side does not and backs down, you will have a good chance of winning a rapid military advantage, regaining your political prestige and silencing your critics in time for the coming elections, and avoiding nuclear war. Put a 'G' on the rung of the ladder where you think this outcome should be.

2. If you back down, but the other side stands by their ultimatum, they will win the political and military advantages. You will be heavily criticised both in your own country and abroad, and you may well lose the election as a result, putting a more extremist government in your place. Put an 'H' on the ladder where you think this outcome should be.

3. If neither of you press the button, so that neither carries out his threat when the ultimatums expire, though you will lose face with your critics, you will both have some time to consider a compromise, which may increase your chances of re-election, and a nuclear war will have been avoided. Put a 'J' on the ladder where you think this outcome should be.

4. If you both press the button to initiate military action, as you said you would, and as you are pressed to do by strong opinions at home and abroad, you may both be forced to use your nuclear weapons and an all-out war may result. Put a 'K' on the rung of the ladder where you think this outcome should be.

Fill in the numbers from the ladder in the cells of the matrix provided. The experiment will be repeated many times, every 10 seconds, so that many decisions can be made in a few minutes.

The light will flash at the moment the ultimatum expires and you must make your decision immediately afterwards and record the result.

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APPENDIX 2.

1. Experiment II: Introduction.

Variations in performance in Prisoner's Dilemma games have been related not only to the structure of the game (e.g. Rapoport & Chamnah, 1965), but to social and personality characteristics of the players (e.g. Terhune, 1968).

Many of these findings may be conveniently summarised by introducing the concept of modes of strategic thinking. Support for outcome-oriented, person-oriented and strategy-oriented modes may be found in such apparently unrelated studies as those of Cooper (1965, 1966) and Roberts, et al. (1959,1962,1963).

Outcome-oriented thinking implies an overemphasis on the immediately-given gains and losses and an inability to take account of the strategic factors in the situation. Person-oriented thinking arises where personal and social aspects of the situation predominate to the extent that, while the immediate payoffs cease to be so important, the player attempts to establish decision-rules of a normative kind. Strategy-oriented thinking takes an 'amoral', long-run approach, exploiting the strategic possibilities of the situation.

In order to examine these suggestions further a second experiment was carried out where, in addition to the procedures adopted in the previous experiment, subjects were (i) required to record their prediction of the other player's choice before each trial, and (ii) questioned immediately following the experiment about their strategic thinking.

Data on the predictions provides further information about cognitive processes of the subjects. If a subject predicts that the partner will choose C (co-operation) a choice of C by the player clearly means something different from a choice of D (defection).

The post-experimental interview gave information not only on the degree of difficulty, annoyance at losing, etc., experienced by the subjects, but also on whether their choices were random, or determined by the immediate payoffs, attempts at co-operating with or exploiting the other player, the long-run gainsfor both, etc. This information, combined with the patterns of responses, gives considerable support to the notion of different modes of strategic thinking, and further, that these modes are somewhat differently distributed amongst men and women.

2. Experiment II.

In the previous study 30 psychology students at the University of Oslo performed 100 trials of a Prisoner's Dilemma and three other games. A second experiment was carried out at the University of Bergen employing 120 women subjects and 148 men in a 100-trial Prisoner's Dilemma game. The sample represents some 10 percent of the female population and some 5 percent of the male population of the University. Subjects were recruited by student assistants throughout the University and thus while not entirely randomly selected they are broadly representative of the student population not only by sex but also by faculty and year of study. Pairs of subjects were matched by sex and social background.

3. Procedure.

Ss performed 100 trials of a Prisoner's Dilemma game with the following matrix displayed:

		B's choices: C	B's choices: D
A's choices	C	6, 6	0, 10
	D	10, 0	2, 2

(This is simply a linear transformation of the matrix (1,1),(-2,2) (2,-2),(-1,-1) by the formula $2(x + 2)$, where x is each value in the matrix. The value of T, the 'temptation' to defect, is then increased from 8 ($2(2 + 2) = 8$) to 10. This transformation has the effect of removing the negative values, which are a practical problem, while retaining the structure of the game with a slightly decreased index of co-operation (see Rapoport & Chammah, 1965). For this game the index of co-operation, $r_1 = \frac{R - P}{T - S} = \frac{6 - 2}{10 - 0} = 0.4$ The index $r_2 = \frac{R - S}{T - S} = \frac{6 - 0}{10 - 0} = 0.6$. The PD game used previously had the values $r_1 = 0.5$, $r_2 = 0.75$.

Each subject was placed in a separate room without knowing who the other subject was. (To avoid inadvertent meetings one subject arrived half an hour before the other and filled out a questionnaire; the second subject completed the same questionnaire after the experiment.) Before each S was a panel containing a switch and three small lamps. Each S controlled one of the lamps, the third lamp being flashed by E to indicate when each choice was to be made. Instructions were given both in writing and verbally by E in language avoiding indicating competition or co-operation.

Immediately before the start of the experiment each S made a rating of himself on a 35-scale Semantic Differential. At the end of the experiment Ss rated the other subject on the same 35 scales. In the case of the males, a second rating of themselves was then made, this time specifically in relation to the other subject.

At the end of the experiment a 'debriefing' interview was conducted and the sum of the payoffs was paid out (in Norwegian öre) together with a modest participation fee. (This was nevertheless considerably larger than the 'winnings', thus reducing real money differences between the subjects.)

4. Results of Experiment II.

Responses on the first trial. Table 1 shows the results on the first trial for men and women. Whilst the men were evenly divided between C and D choices, the women chose somewhat more Cs, which was not the case in the previous investigation. Slightly under half of both groups predicted that the partner would choose C - that is, fewer predicted that the partner would choose C than chose C themselves. Of those who predicted that the partner would choose C about one-third chose D. Of those who predicted that the partner would choose D, about one-half of the women and two-thirds of the men themselves chose D.

TABLE 1. Players' choice on Trial 1 by prediction of partner's choice.

	Predicted C[1]			Predicted D[2]			No prediction		
	Women	Men	Total[3]	Women	Men	Total[3]	Women	Men	Total
C on Trial 1	41	47	88	32	24	56	3	3	6
D on Trial 1	17	23	40	27	46	73	0	5	5
Total	58	70	128	59	70	129	3	8	11

1. For Ss who predicted C, chi-square = 0.058, df = 1, $p > .80$, ie. there was no difference between men and women.

2. For Ss who predicted D, chi-square = 4.407, df = 1, $p < .05$, ie. a significant difference between men and women.

3. For the total sample, choice on Trial 1 by prediction of partner's choice, chi-square = 16.124, df = 1, $p < .001$, ie. the prediction of the partner's choice was significantly related to the player's choice.

On the first trial, though the prediction of the partner's choice plays a significant role in determining the player's choice, this seems to be more the case for the men than for the women.

Responses on Trial 2. Trial 2 is of particular interest because the outcome of Trial 1 has by then provided the players with their first real piece of information about each other.

Table 2 shows the frequency of the four possible outcomes on the first trial and the relative frequency of each of these being followed by a C (co-operating) response on Trial 2.

TABLE 2. Percentage frequency of the 4 outcomes (f) and the relative frequency of each being followed by a C choice on Trial 2 (rfC).

Outcome on Trial 1	Women f	Women rfC	Men f	Men rfC	Total f	Total rfC
CC	42	.54	27	.57	34	.55
CD	22	.34	23	.58	22	.47
DC	22	.29	23	.44	23	.37
DD	14	.35	27	.30	21	.32

While the four possible outcomes were evenly distributed amongst the pairs of men, the women, as a consequence of the higher proportion of C choices on the first trial, had a relatively higher proportion of CC outcomes. The men, on the other hand, responded more frequently with C on Trial 2 after three of the four outcomes.

H_o is the hypothesis that choices on both trials are random. The expected and the observed distributions are compared in Table 3.

TABLE 3. Expected (f_e) and observed frequencies (f_o) under H_o on Trials 1 and 2.

Choice on Trials 1&2	Women[1] f_e	Women[1] f_o	Men[2] f_e	Men[2] f_o	Total[3] f_e	Total[3] f_o
C_1C_2	30	36	37	43	67	79
C_1D_2	30	40	37	30	67	70
D_1C_2	30	14	37	27	67	41
D_1D_2	30	30	37	44	67	74

1. $\chi^2 = 7.79$, df = 3, $p < .05$ 2. $\chi^2 = 3.29$, df=3, $p > .30$. 3. $\chi^2 = 7.63$, $p < .05$

Whilst the null hypothesis can be rejected at the 5 percent level for the women and the sample as a whole, it cannot be rejected in the case of the men taken alone.

H_1 was the hypothesis that the subjects, like the rat in the T-maze would alternate their choices as a way of exploring the situation. To avoid the difficulty of zero values in some cells the hypothesis was tested with expected frequencies of two-thirds of the sample alternating, the rest taking the same choice. The null hypothesis that there is no difference between the resulting distribution and the observed frequencies can be rejected at the .001 level for the whole sample, and for the men and women taken separately (Table 4).

TABLE 4. Expected(f_e) and observed frequencies (f_o) under H_1 (alternation) on Trials 1 and 2.

	Women[1]		Men[2]		Total[3]	
	f_e	f_o	f_e	f_o	f_e	f_o
C_1C_2	20	36	24	43	44	79
C_1D_2	40	40	50	30	90	70
D_1C_2	40	14	50	27	90	41
D_1D_2	20	30	24	44	44	74

1. $\chi^2 = 19.089$, df = 3, $p < .001$
2. $\chi^2 = 23.090$, df = 3, $p < .001$
3. $\chi^2 = 38.386$, df = 3, $p < .001$

H_2 was the hypothesis that the choice on Trial 2 would be influenced by the 'reward' or 'punishment' on Trial 1 - the utility maximisation hypothesis. This implies that those subjects who received a high payoff (10 or 6) on Trial 1 would make the same choice on Trial 2; those who received a low payoff (2 or 0) would make the opposite choice on Trial 2. The results under this hypothesis are shown in Table 5.

For the women, but not for the men or the sample as a whole, the null hypothesis under H_2 may be rejected at the .01 level.

While almost exactly the same proportion (40.8 percent of the women and 39.2 percent of the men) of those who won on the first trial changed their choice on the second trial, 47.8 percent of the women and only 35.2 percent of the men who lost changed their choices.

TABLE 5. Subjects who made the same or opposite choices on Trial 2 as a function of whether they 'won' or 'lost' on Trial 1.

		Women[1]		Men[2]		Total[3]	
		Same	Change	Same	Change	Same	Change
Trial 1	Won	45	31	45	29	90	60
	Lost	23	21	48	26	71	47
	Total	68	52	93	55	161	107

1. $\chi^2 = 6.486$, df = 1, p = .01
2. $\chi^2 = 0.042$, df = 1, p > .80
3. $\chi^2 = 2.013$, df = 1, p > .10

The final hypothesis presented previously, H_3, was that the subjects would tend to hold their choices constant on the first two trials in order to maximise the information. The sequence of trials required to predict any regularities in the partner's pattern of choices will be shorter if the player holds his own choices constant. Clearly this makes his behaviour easier for the opponent to predict which may be a disadvantage in a strategic, mixed-motive interaction. The increased payoff in information may be offset by the increased risk of exploitation by the partner, so that such constancies may be expected to be of limited extent except where the players deliberately use their choices to attempt to communicate with the partner (see later). Table 6 presents the results under H_3, again adopting the 'two-thirds' principle in order to avoid zero entries in the matrix.

TABLE 6. Expected(f_e) and observed frequencies (f_o) under H_3 (information maximisation) on Trials 1 and 2.

	Women[1]		Men[2]		Total[3]	
	f_e	f_o	f_e	f_o	f_e	f_o
C_1C_2	40	36	50	43	90	79
C_2D_2	20	40	24	30	44	70
D_1C_2	20	14	24	27	44	41
D_1D_2	40	30	50	44	90	74

1. $\chi^2 = 9.365$, df = 3, $p < .05$
2. $\chi^2 = 1.699$, df = 3, $p > .50$
3. $\chi^2 = 8.283$, df = 3, $p < .05$

In the case of the women and the sample as a whole the hypothesis can be rejected at the 5 percent level. For the men, however, there is a greater than 50 percent chance that there is no difference between the observed and the expected frequencies under H_3.

It must be concluded that there is no clear evidence for any of the hypotheses. But there are definite indications that on the second trial the women are more influenced by the immediate effects of their choices (H_2), whereas the men may well place more emphasis on acquiring information necessary for explicitly strategic modes of thinking (H_3).

Responses over 100 trials.

TABLE 7. Response indices over 100 trials.[1]

	Women	Men	Total
- Mean % C-choices	41.7 (41.6)	49.7((52.5)	46.1 (48.5)
- C-choices predicted	44.6	55.3	50.5
- Correct predictions	59.4	66.1	63.7
- Conditional probability of C following:-			
- CC outcome (x)	.56 (.53)	.65 (.67)	.61 (.60)
- CD outcome (y)	.37 (.32)	.38 (.41)	.38 (.36)
- DC outcome (z)	.37 (.35)	.37 (.50)	.37 (.42)
- DD outcome (w)	.34 (.33)	.33 (.39)	.33 (.36)
- own C-choice(eta)	.47 (.43)	.52 (.54)	.49 (.48)
- own D " (zeta)	.36 (.34)	.35 (.45)	.35 (.36)
- partner's C (xi)	.47 (.44)	.51 (.59)	.49 (.51)
- partner's D(omega)	.36 (.33)	.36 (.40)	.36 (.36)
- Mean CC outcomes	20.8	31.34	26.54
- Mean CD+DC outcomes	42.33	36.87	39.31
- Mean DD outcomes	37.09	31.93	34.24

1. Figures in brackets are those from Experiment 1.

Table 7 shows that over 100 trials the men chose slightly more Cs than the women ($t=3.540$, $p<.0005$, with a one-tailed test); that they predicted more Cs ($t = 3.451$, $p<.0005$, one-tailed test); and that more of their predictions were correct ($t = 4.277$, $p< .0005$, one-tailed test). The result was a higher occurrence of CC outcomes and fewer CD/DC and DD outcomes, significant at the .0025, .01, .025 and .05 levels respectively.

Figure 1 shows the progression of responses and predictions over 100 trials by blocks of 10. While both men and women improve their predictions, the men are more successful. Only the men appear to increase in the proportion of co-operative choices.

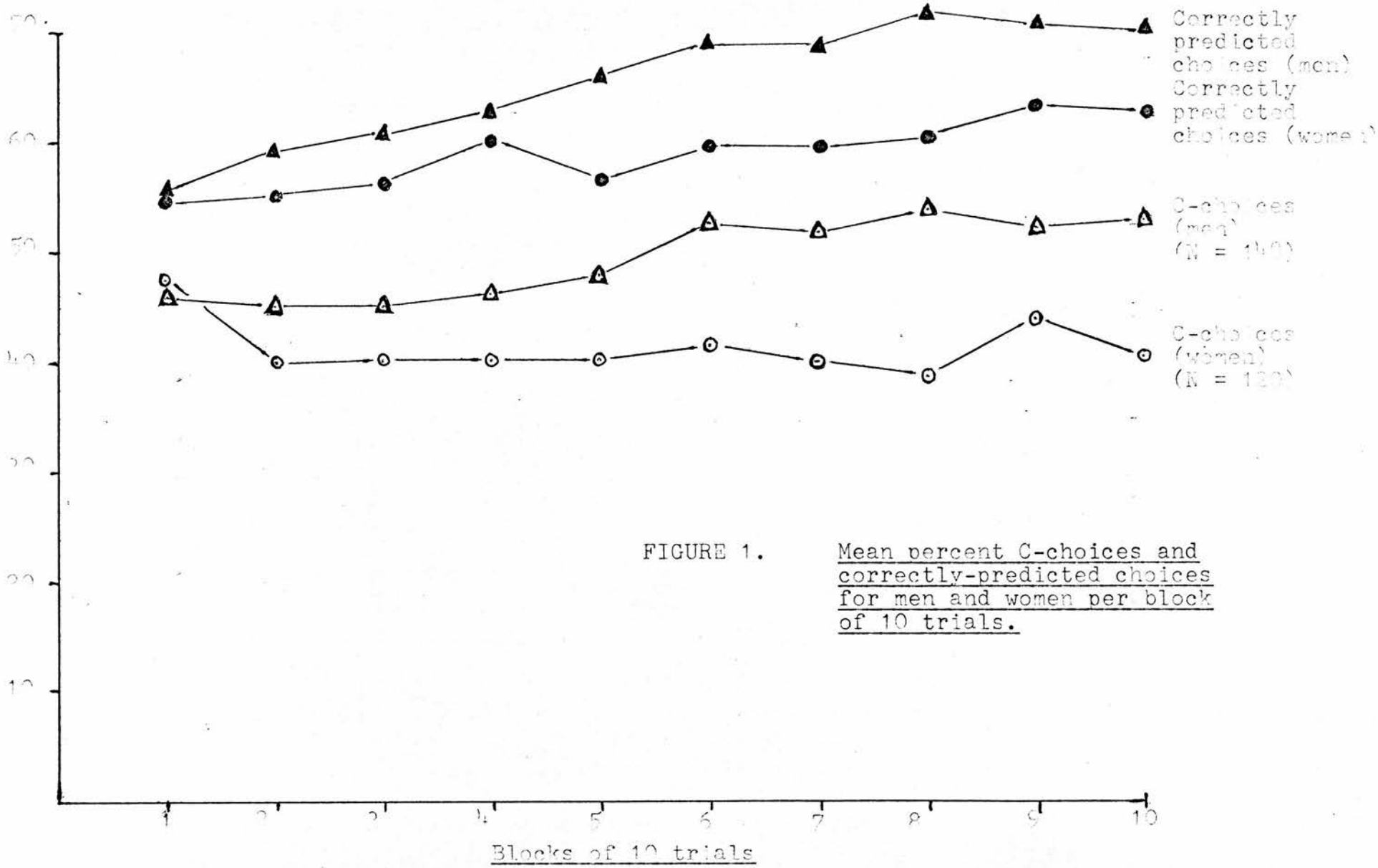

FIGURE 1. Mean percent C-choices and correctly-predicted choices for men and women per block of 10 trials.

The results corroborate the previous findings to a remarkable degree and in spite of the differences in the appearence of the game (and a slight decrease in the indices of co-operation). Very few of the figures in the Table 7 vary by more than a few percent. The z value, the conditional probability of choosing C following a DC outcome, was .13 larger for the men in Experiment I, the largest discrepancy. The present much more representative sample suggests that the high z for men in Experiment I compared with women is not a reliable finding.

Compared with Rapoport and Chamnah's (1965) results both Norwegian samples are less extreme in their responses, either to the partner's co-operation or to his defection. Differences between the sexes are also less marked in the Norwegian samples. However, these results are obtained from 100 trials, whereas Rapoport and Chammah ran 300 trials, and used a variety of games and conditions. In the present experiment there was an increasing difference between men and women which may or may not have continued had the game been extended for a further 200 trials. (See Figure 1.)

The men respond with C more frequently than the women following a CC outcome (x) ($t = 2.565$, $p < .01$, one-tailed test); following their own choice of C (Rapoport's eta) ($t = 4.195$, $p < .0005$); and following the partner's choice of C (Rapoport's xi) ($t = 4.113$, $p < .0005$).

We may now take the predictions into account and test the hypothesis that the men are more co-operative than the women whatever the previous outcome and whatever their prediction (Table 8).

TABLE 8. Relative frequencies of choices and predictions after each outcome.

Outcome	Prediction	Choice	Women	Men	t-test	significance
CC	C	C	.28	.52	3.668	.001
	C	D	.26	.21	2.132	.05
	D	C	.17	.12	2.662	.01
	D	D	.16	.11	2.600	.01
CD	C	C	.17	.21	1.805	.10
	C	D	.30	.29	0.555	--
	D	C	.19	.17	1.221	--
	D	D	.29	.27	1.033	--
DC	C	C	.16	.19	1.302	.20
	C	D	.24	.28	1.878	.10
	D	C	.20	.18	1.322	.20
	D	D	.36	.34	0.570	.01
DD	C	C	.11	.11	0.361	--
	C	D	.18	.18	0.372	--
	D	C	.22	.21	1.015	--
	D	D	.44	.44	0.256	--

1. Two-tailed test. The figures do not always sum to 1.00 due to missing predictions.

Table 8 shows that the men are not more co-operative on all indices. Following the CD and DD outcomes the majority response of both men and women was to choose D, even though C was predicted as often as D. Following the DC outcome, though more of the women predicted that the partner would choose D on the subsequent trial, 60 percent of the women and 57 percent of the men chose D.

Following the CC outcome 64 percent of the women and 73 percent of the men on average predicted that the partner would choose C. Of these proportions 71.2 percent of the men and 59.4 percent of the women themselves chose C.

The figures strongly suggest that the outcome of the previous trial has a much more pronounced influence on the choice on the next trial than the prediction of the partner's choice. The predictions seem to reflect the learning of probabilities since they coincide well with the behavioural results. Note that the higher probabilities are over-estimated and the lower ones underestimated (Vail, 1954; Edwards, 1954; Van der Meer, 1963) (Table 9). (In

TABLE 9. Predicted and actual conditional probabilities of C-responses.

	Women		Men	
	Prediction	Response	Prediction	Response
C after CC	.64	.56	.73	.65
C after CD	.47	.37	.50	.38
C after DC	.40	.37	.47	.37
C after DD	.29	.34	.29	.33

this situation it should be remembered that the utilities may well play a role in determining the subjective probabilities. If a player chooses C following CC he may predict that the partner will also choose C not only because it is statistically likely, but also because the player hopes to gain the high payoff for mutual co-operation and avoid the low 'sucker's' payoff for unreciprocated co-operation. On the other hand, if a player chooses D after a DD outcome his hopes that the other player will change his choice, thus giving the player the maximum payoff, may help to reduce his subjective probability of the partner choosing D. However, the later is not the case here since the prediction of C following DD was the lowest and lower than the actual responses. The role of selective attention or cognitive dissonance should not be overlooked but does not offer a simple explanation.)

From the behavioural responses we may draw the conclusion that the men respond more co-operatively to C-choices, and, perhaps as a result of the more consistent C-choices, they make more correct predictions. The predictions themselves do

The post-session questionnaire. As a further source of information on the decision processes a brief interview was conducted immediately following the experiment. Standard questions were employed in an attempt to cover the major possible modes of strategic thinking. The majority of the subjects clearly identified one or two of the alternatives as characteristic of their own performance.

TABLE 10. Post-session questionnnaire.

Question.	Women (%)	Men (%)	χ^2	df	p
1. Was it difficult to predict the other person's choices?					
VERY DIFFICULT	3.4	7.9			
QUITE DIFFICULT	36.2	23.7			
QUITE EASY	56.0	54.7			
VERY EASY	4.3	13.7			
			11.389	3	<.01
2. Do you think the other person found it difficult to predict your choices?					
VERY DIFFICULT	3.4	7.7			
QUITE DIFFICULT	43.2	35.2			
QUITE EASY	44.9	41.5			
VERY EASY	8.5	15.5			
			5.933	3	>.10
3. Did you try to make your choices difficult to predict?					
YES	60.0	32.6			
NO	40.0	67.4			
			18.119	1	<.001
4. Was it difficult to decide which choice to make?					
VERY DIFFICULT	0.8	0.0			
QUITE DIFFICULT	8.4	9.7			
QUITE EASY	52.1	66.9			
VERY EASY	38.7	23.4			
			8.694	3	<.05
5. Who had the most control over the situation?					
PLAYER	21.2	28.1			
PARTNER	22.9	19.2			
BOTH EQUAL	55.9	52.7			
			1.793	2	>.30
6. Did you choose randomly?					
YES	22.0	5.5			
NO	78.0	94.5			
			15.939	1	<.001

TABLE 10(contd.)

Question	Women	Men	χ^2	df	p
7. Did you choose mostly according to your immediate gains?					
YES	39.0	39.7			
NO	61.0	60.3			
			.015	1	>.95
8. Did you decide on a pattern of choices without regard to the other player?					
YES	23.5	18.6			
NO	76.5	81.4			
			.954	1	>.30
9. Did you wait to see if you could discover your partner's strategy before you found a strategy yourself?					
YES	43.7	56.3			
NO	42.7	57.3			
			.028	1	>.90
10. Did you try to communicate a strategy to your partner?					
YES	51.3	62.1			
NO	48.7	37.9			
			3.118	1	just >.05
11. Did you try to hide a strategy from your partner?					
YES	21.0	31.7			
NO	79.0	68.3			
			3.817	1	=.05
12. Did you try to influence your partner's choice by 'rewarding' some choices and 'punishing' others?					
YES	52.1	65.5			
NO	47.9	34.5			
			4.814	1	<.05
13. Which of these strategies did you use most?					
RANDOM (6)	9.2	1.4			
EFFECTS (7)	14.3	4.1			
PATTERN (8)	7.6	6.2			
INFORMATION (9)	7.6	18.5			
COMMUNICATION (10)	28.6	45.9			
MACHIAVELLI (11)	11.8	12.3			
MANIPULATION (12)	9.2	4.1			
Other	3.4	4.1			
Don't know	8.4	3.4			
			32.901	8	<.001

Somewhat more of the women found it difficult to predict the other person's choices, which is also shown by the results of the predictions (Table 7). A higher proportion of women answered that it was 'very easy' to decide which choice to make 60.0 percent, compared with 32.6 percent of the men, said that they tried to make their choices difficult to predict. A significantly higher number of women chose randomly or tried to influence their partner's choices by reward and punishment.

A higher proportion of men tried to communicate a strategy to the other player or to hide a strategy from the other player.

Over 100 trials there are opportunities for many strategies. Question 13 asked which was the most characteristic strategy. The most used by both men and women was the co-operative strategy of trying to communicate with the partner. Almost twice as many men (45.9 percent) as women (28.6 percent) answered in this category. The women otherwise chose most often randomly, according to the immediate payoffs (effects), or tried to manipulate the other player by controlling the effects of her choices. The men more often than the women attempted to gain information about the partner's response pattern.

The questions were based on the theory that the situation enables several levels of cognitive complexity to function. The simplest level is random choices, taking into account neither the payoffs, nor the other player. The next level involves taking account of either of the payoffs, the fact that one's choices directly affect the outcome, or the other player, that is, at least one of the variables in the situation. Higher levels of cognitive complexity take account of several or all of these levels. These variables can be conceived of as a three dimensional space where it is possible for any individual to be high or low on any dimension.

The results of the questionnaire give considerable support to this conception. At least 20 percent of the subjects answered to each category, suggesting that the hypothetical dimensions were at least partially operative. Further it is obvious that men and women are somewhat differently distributed in this three-dimensional space. The men were more 'strategic', taking more account of the need for information in order to predict the partner's responses, either in order to communicate their own (co-operative) strategy to him, or to hide a (competitive) strategy from him. Insofar as the women took account of the partner they more often tried to influence the partner by administering rewards and punishments rather than by more long-term strategies.

The question of motivation arises but is difficult to answer. About a quarter of the subjects admitted they were a little annoyed at the partner when they lost. Many others expressed interest in the experiment by wanting to meet the other person, hear more of the purpose or the results, or by saying they had enjoyed it. There were no indications that the women were particularly disinterested, which might otherwise be an explanation of the higher incidence of random choice.

Semantic Differential ratings. A 35-scale semantic differential was employed to measure the perceptions that each player had a) of himself, and b) of the other person. Previously sixteen scales had been used, drawn from Osgood, Suci and Tannenbaum (1957), where eight were assumed to be loaded on the evaluative dimension, four on the Potency dimension and four on the Activity dimension. A factor analysis provided no support for this assumption since it resulted in seven factors both in the experimental study and in the field study in Cyprus (though the factors were different in each case).

Several of the studies quoted by Miron and Osgood (1966) indicate that there is a scale-concept interaction, such that where a particular class of concepts is rated a factor structure specific to that class may emerge. If, however, the factor structure is more complex than the commonly found three it becomes necessary to make a more representative sampling of the possible factors by including more adjective scales. As a preliminary step towards developing a set of scales appropriate to (i) ratings of persons and social concepts, and (ii) Norwegian language and culture, a semi-systematic method was adopted to draw out from the culture an appropriate list of adjectives. Starting with the stimulus words used by Miron and Osgood, a set of ten person words, (e.g. MOTHER), twelve occupation words (e.g. TEACHER), eighteen nationalities (e.g. SWEDES) and thirty-six general social concept words (e.g. HUNGER, DEATH, WEALTH, THE FUTURE) were presented to fifteen judges (employees of the University of Bergen). The judges were asked to write all the appropriate adjectives they could think of for each stimulus word. The result was some 1700 adjectives which were then examined for frequency and generality of usage. 19 pairs of the most-used, non-synonymous adjectives were added to the 16 pairs used previously.

The factor analysis of the ratings of self and other (two ratings of self were made by the men, one before and one after the experiment; there were thus 5 sets of ratings in all, which were 'strung out' to make a matrix 690 x 35) is shown in Table 11 (principal components method with Varimax rotation). As before 7 factors emerge. The total variance accounted for is approximately the same as in Experiment 1 (55.62 percent now compared with 58.90 percent previously), though this time the first factor is stronger (20.95 percent of the total variance) and more clearly a general evaluative factor.

A factor analysis of the SD self ratings with 35 indices of the responses in the experiment shows no obvious relationships. A factor analysis of the SD ratings of the partner shows several relationships between response indices and

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1. The criterion is the Kaiser test of number of factors where the cut-off is at the last latent root greater than 1.0. Cattell (1966) believes that this gives too few factors where the number of variables is less than 20 and too many where there are more than 50 variables (p.207).

TABLE 11. Rotated factor matrix of semantic differential ratings.

Scale.	Factor.						
	I	II	III	IV	V	VI	VII
fortunate-unfortunate	o.17	.08	-.19	-.13	.56	-.10	-.29
sociable-unsociable	.60	-.08	-.04	.35	-.19	-.02	-.12
unkind-kind	-.38	-.19	.14	-.53	.16	.01	-.09
honest-dishonest	.67	-.02	-.04	.01	.09	-.18	.09
unintelligent-intelligent	-.15	.01	.76	-.19	-.05	.09	-.05
good-bad	.40	-.14	-.38	-.01	-.23	-.20	-.25
altruistic-egoistic	.37	.05	-.02	-.08	-.63	.07	-.11
quarrelsome-congenial	-.21	-.34	.08	-.49	.22	.22	-.02
brave-cowardly	.18	-.15	-.12	-.13	-.37	-.62	-.12
weak-strong	.01	.00	.30	-.05	-.05	.65	-.14
severe-lenient	.19	-.08	-.06	-.56	.22	-.23	-.07
feminine-masculine	.06	-.03	.17	.09	.06	.06	-.76
active-passive	.25	-.43	-.05	-.09	-.05	-.51	.00
easy-difficult	.62	.06	-.04	.30	-.32	.02	-.08
excitable-calm	.03	-.76	.06	-.12	.09	-.01	.06
unintentional-deliberate	-.07	-.49	.50	.10	-.08	.23	-.17
dominating-mild	-.15	-.41	-.01	-.56	.15	-.14	.02
warm-cold	.43	-.36	-.02	.25	-.10	.14	-.26
hard-soft	-.14	-.03	.02	-.67	-.01	-.17	.16
stupid-clever	-.08	-.04	.76	-.20	-.08	.27	-.01
conscientious-unconscientious	.69	-.00	-.03	.10	.05	-.09	.01
aggressive-phlegmatic	-.03	-.59	-.01	-.38	-.01	-.26	-.05
reasonable-unreasonable	.56	.10	-.50	-.15	-.04	-.01	-.02
moral-immoral	.60	.16	-.10	-.10	.07	-.11	-.19
decisive-uncertain	.31	.03	-.21	-.32	.03	-.50	-.07
helpful-troublesome	.70	-.12	-.10	.32	-.18	-.05	.02
naive-wise	-.03	-.03	.79	-.07	.01	.14	-.03
harsh-gentle	-.14	.02	.11	-.61	-.29	-.02	.26
pleasant-unpleasant	.54	.09	-.09	.24	.18	-.06	-.37
authoritarian-democratic	-.26	-.00	.16	-.66	.08	-.04	-.13
ambitious-lazy	.10	-.07	-.08	-.31	.08	-.44	-.25
weak-willed-strong-willed	-.03	-.10	.15	-.13	-.25	.72	-.13
reliable-unreliable	.73	-.07	-.08	.14	.05	-.07	.02
unjust-just	-.40	.06	.26	-.49	-.09	.13	-.27
surly-sweet	-.17	-.12	.17	-.60	-.08	.25	.32
CUMULATIVE PERCENTAGE	20.95	32.81	40.86	45.34	49.21	52.67	55.62

the general evaluative factor (Table 12). The factor loadings for the men and the women are very similar, though with several exceptions. Whilst women use the scale 'feminine-masculine' to refer to their partner, men use the scale 'excitable-calm'. The men have higher loadings on the scales 'honest-dishonest', 'intelligent-unintelligent', 'conscientious-unconscientious', 'reasonable-unreasonable' and 'ambitious-lazy' whereas the women give higher loadings to 'kind-unkind', 'warm-cold', 'soft-hard', 'phlegmatic-aggressive', 'gentle-harsh', 'just-unjust', and 'sweet-surly'.

5. Summary and conclusions.

In Experiment II 120 women and 148 men performed 100 trials of a Prisoner's Dilemma game. The results were a clear replication of most of the response indices obtained in Experiment I. Women were shown to choose fewer C (co-operative) choices than men, even following their own, their partner's or mutual co-operation on the previous trial. Predictions of the partner's response followed the actual probabilities, though the more likely choices were over-estimated and the least likely under-estimated, both by men and women. The predictions of the partner's choice seemed to have little influence on the players' choices which were more a function of the previous outcome.

Analysis of behaviour on the first and second trials, over 100 trials and the results of the post-session questionnaire indicated sex differences in strategic thinking. The women were more often influenced by the immediate outcomes and more often tried to use their control over the partner's immediate outcome as a means of reward and punishment. The men more often used the partner's choices as a source of information about his strategies in order to devise appropriate counter-strategies for co-operation or exploitation.

Though the partner was evaluated on the semantic differential in terms of his relative degree of co-operation, the ratings of 'self' bore no obvious relationship to performance. In their ratings of the partner women more often stressed integrative attributes (just, warm, gentle) whereas men used more 'instrumental' scales (intelligent, honest, conscientious, ambitious).

The results of these experiments provide a basis for the further empirical investigation of the cognitive substrate of strategic behaviour which has been given little attention in the litterature.

Additional Reference.

TERHUNE, K.W., 'Motives, situation and interpersonal conflict within Prisoner's Dilemma'. J. pers. soc. Psychol. Monog. Suppl., 8, (No. 3, Part 2), 1968.

TABLE 1?. Factor loadings on the major factor of the SD ratings of partner and the response indices.

Variable	Loading Women	Men
Partner's %C (high-low)	.23	.34
$\%C_{player} - \%C_{partner}$	.34	.27
%CD outcomes (low-high)	.??	.?7
sociable-unsociable	.84	.78
kind-unkind	.79	.64
honest-dishonest	.41	.59
intelligent-unintelligent	.29	.41
good-bad	.43	.34
altruistic-egoistic	.54	.56
congenial-quarrelsome	.4?	.69
feminine-masculine	.47	(-.08)
easy-difficult	.83	.82
calm-excitable	(-.09)	.37
mild-dominating	.6?	.56
warm-cold	.72	.??
soft-hard	.76	.59
conscientious-unconscientious	.48	.74
phlegmatic-aggressive	.44	.21
reasonable-unreasonable	.31	.55
moral-immoral	.54	.45
helpful-troublesome	.78	.78
gentle-harsh	.57	.27
pleasant-unpleasant	.72	.70
democratic-authoritarian	.71	.68
lazy-ambitious	.16	.46
reliable-unreliable	.70	.65
just-unjust	.5?	.69
sweet-surly	.65	.47
PERCENTAGE OF TOTAL VARIANCE	16.?	12.1